Louisiana Department of Health
Office of Public Health
Center for Environmental Health

Louisiana BEACH Grant Report
2021 Swimming Season

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EXECUTIVE SUMMARY

This document was prepared to partially fulfill the Louisiana Department of Health's (LDH; formerly known as Louisiana Department of Health and Hospitals [LDHH]), Office of Public Health, Center for Environmental Health Services (CEHS) reporting obligations under the U.S. Environmental Protection Agency's (USEPA) BEACH grant program, Federal Assistance Agreement Number CU-01F78051-0. Prior to publication of this report, the document was distributed to USEPA and the Louisiana Department of Environmental Quality for comments. The comments provided by both agencies were incorporated into this report. The report was made available to the public through CEHS's Beach Monitoring Program website (https://ldh.la.gov/page/288).

As documented in *Louisiana's BEACH Grant Final Report – Grant Year 2001* (LDHH 2003; the Beach Grant Report) and *Louisiana's Beach Program Quality Assurance Project Plan* (QAPP; LDH 2021), CEHS is to submit an annual technical report to USEPA after the end of the recreational period that summarizes the number of beaches monitored in each Tier, lists any additional beaches to be added to the Program or Tier reassignments to be made in the next year, presents a compilation of sampling results, and summarizes beach assessment activities and response actions. The report is to also include for Tier 1 and 2 beaches, the number of beach monitoring stations for which advisories were issued, the number of times beach advisory criteria were exceeded and the number of days under advisories for each beach monitoring station. This report satisfies the reporting obligations set forth in the Beach Grant Report and outlined above.

Between 1 April 2021 and 31 October 2021, a total of 597 samples were collected at 23 sample stations across 9 Tier 1 or 2 continuous beach segments. Monitoring was initiated and conducted on schedule from the start of the monitoring season (1 April) through the end of the season (31 October). However, scheduled sampling at all 23 sample locations was missed during the week of May 16, 2021, due to severe storms resulting in unsafe sampling conditions during that week, and Hurricane Ida struck the Louisiana coast on August 29, 2021, closing Elmer's Island (ELMR1) and Grand Isle beaches (GIB1-3 and GISP1-4) for the balance of the swimming season. Hurricane Ida also disrupted sampling at the remaining 15 sampling locations from August 29, 2021, through the week of September 19, 2021.

Enterococci densities were relatively stable between 2020 and 2021 and comparable to recent years at Elmer's Island, Fontainebleau State Park, Grand Isle Beach, Holly Beach and Rutherford Beach, and higher at Constance Beach Complex, Cypremort Point State Park, Grand Isle State Park and Lake Charles North Beach. Salinity during 2021 was within the expected range and did not appear to influence water quality except at LCNB, which had low salinity and higher enterococci densities in both 2019 and 2021.

During the 2021 swimming season (1 May – 31 October), 51 advisories and 8 closure were issued. Advisories were issued at all Tier 1 or 2 sample stations during 2021 based on observed water quality exceedances. Compliance at stations monitored throughout the swimming season varied between 79% of monitored days in compliance (GIB3), to a low of 4% (LCNB1). Across all monitored sample stations, 44% (1,647 of 3,702) of the 2021 swimming season's available

station-days (monitored station-days not under closure) were in compliance and not under an advisory.

Beach advisories issued in 2021 resulted from exceedances of enterococci geometric mean or single sample maximum criteria (the weekly sample must be ≤104 MPN/100 ml and a steady state maximum, based on a 30-day running geometric mean, must be ≤35 MPN/100). The enterococci geometric mean was exceeded in 311 of 327 (95%) observed noncompliant station-weeks, with 206 (63%) of those noncompliant weeks resulting from enterococci geometric mean exceedances only, 105 (32%) resulting from both enterococci geometric mean and single sample maximum exceedances, and 16 (5%) resulted from exceedance of enterococci single sample maximum criterion alone.

Louisiana would have issued only 44% of its 2021 advisories if the State's decision rule were based only on the enterococci single sample maximum criterion (≤104 CFU/100mL). If Louisiana had used the Beach Action Value (BAV) criterion of 60 CFU/100mL[1] during 2021 in lieu of its current criteria, 77% of the weekly advisory decisions would have been unchanged, 20% of station-weeks placed under advisory for exceedance of Louisiana's criteria would be deemed in compliance, and 3% of 2021 station-weeks exceeded the BAV criteria but were in compliance with Louisiana's beach advisory criteria. Accordingly, Louisiana's beach advisory criteria are more protective of public health than the BAV criterion, and Louisiana's GM criterion identifies periods of likely high risk, which result in advisories being extended during weeks with missed samples.

Based on year-end audit and data review, all completeness goals were achieved during 2021, and there were no variances from the QAPP detected. Of the 597 samples successfully processed, all results were considered valid and recorded in the Program's database. All monitoring and notification data collected during 2021 have been uploaded to the appropriate USEPA data storage systems (available through EPA's Water Quality Portal [https://www.waterqualitydata.us/] and BEACON [https://watersgeo.epa.gov/beacon2/about.html]).

In preparation for the 2022 Beach monitoring season, risk levels at monitored beaches were reassessed to determine whether additional beaches warranted monitoring. Risk is a function of historical water quality conditions based on past sampling and beach use. Based on observed use levels and patterns during the 2021 swimming season and projections of use for the 2022 swimming season, it is anticipated that use levels and patterns will remain at approximately historical levels for all beaches.

The anticipated use and historical water quality risk levels resulted in the 2022 monitoring season classification of six continuous beach segments as Tier 1 beaches (Fontainebleau state Park [FNTB], Elmer's Island [ELMR], Grand Isle [GISP] and Cypremort Point State Parks [CYPTSP], Holly Beach [HOLLY], and North Beach [LCNB]), three beach segments as Tier 2 (Grand Isle Beach [GIB], the Constance Beach Complex [CNSTBC], and Rutherford Beach [RUTH]), and one Tier 4 beach segment (Elmer's Island East). Based on 2021 sampling and

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[1] As recommended in *National Beach Guidance and Required Performance Criteria for Grants*, EPA-820-D-13-001, dated April 18, 2014.

2022 expected use, it is anticipated that the approximately 6 beach miles as Tier 1 beaches, approximately 14 miles as Tier 2 beaches, and 0 miles of 1.96 miles of Tier 4 beaches will be monitored during 2022.

CHAPTER 1. Purpose, Background and 2021 Program Accomplishments

Purpose

According to *Louisiana's BEACH Grant Final Report – Grant Year 2001* (the Beach Grant Report; LDHH 2003) and *Louisiana's Beach Program Quality Assurance Project Plan* (QAPP; LDH 2021), the Louisiana Department of Health (LDH; formerly known as Louisiana Department of Health and Hospitals [LDHH]), Office of Public Health (OPH), Center for Environmental Health Services (CEHS) is to submit an annual technical report to U.S. Environmental Protection Agency (USEPA) after the end of the recreational period. The report should accomplish the following: summarize the number of beaches monitored in each Tier, list any additional beaches to be added to the Program or Tier reassignments to be made in the coming year, provide a compilation of the sampling results, and summarize beach assessment activities and response actions. This report serves as the annual technical report for the 2021 recreational period and satisfies all the requirements described above.

This document consists of four chapters. In this chapter, 2021 Program accomplishments are summarized. Chapter 2 contains a summary of the number of beaches that were monitored in each Tier, and a description of updates to Louisiana's BEACH Program, as anticipated under the Beach Grant Report. Louisiana's BEACH Program updates include descriptions of 2021 Program modifications and changes to Tier assignments and beaches to be monitored under the Program in 2022. In Chapter 3, monitoring and response actions for 2021 are provided. Data quality assessment results for the 2021 swimming season are presented in Chapter 4. Appendix A contain station IDs and names, USEPA IDs, locations (latitude and longitude), beach lengths, and maps of beach sample sites. Appendix B contains graphical time series analyses of water quality data, and appendix C contains sample results. Appendix D provides a summary of how Louisiana's BEACH Program has fulfilled the original BEACH Grant requirements.

Background

Water is one of Louisiana's greatest natural resources. Louisiana's vast estuarine basins provide a unique playground for swimming, wading, boating, fishing, and other aquatic activities; however, swimming in waters with high bacteria densities from fecal sources are a known threat to public health, causing elevated rates of gastrointestinal illness. Louisiana Department of Environmental Quality (LDEQ) has historically conducted routine ambient monitoring of state coastal waters designated for primary contact recreation and utilized fecal coliform criteria to assess attainment of ambient water quality standards for swimming uses. However, coastal recreation waters and "high-use" swimming waters had not been designated in state regulations by LDEQ, and there were no mechanisms in place to routinely sample water quality or to provide the public with the results of risk-based analyses that allow for an informed decision prior to swimming at coastal beaches.

In response to growing concern about public health risks posed by polluted bathing beaches, the U.S. Congress passed the BEACH Act in 2000. In 2001, the USEPA, under the provisions of the BEACH Act, made grant funds available to the OPH for the development of a monitoring and notification program for high-use coastal recreation sites, referred to as Louisiana's BEACH

Program. Since initial grants were awarded, Louisiana's BEACH Program has been developed and successfully implemented under the guidance of the CEHS, in cooperation with LDEQ.

Consistent with USEPA's guidance, Louisiana's BEACH Program consists of two primary activities: monitoring and notification. Since bacteriological contaminants cannot be effectively monitored directly, monitoring for fecal contamination of surface waters requires the identification of indicator organisms that are associated with fecal contamination and readily monitored using available technologies. Like most other states, Louisiana historically used fecal coliform densities as the indicator of bacteriological contamination of surface waters. However, under the terms of BEACH grant awards, states must base decisions about marine water quality at sites monitored using BEACH grant funds on enterococci bacteria densities. Enterococci have become accepted by the scientific community as more closely associated with rates of gastrointestinal illness in marine environments than fecal coliform densities, and thus USEPA believes that the use of enterococci may serve to better protect the public health in marine environments.

The second primary activity under the Program is public notification. Louisiana's BEACH Program issues public health advisories at Tier 1 and 2 monitored sites (tiers are defined in Chapter 2) when water quality samples are found to exceed the beach advisory enterococci criteria. The advisory criteria consist of a single sample maximum (the weekly sample enterococci density must be ≤104 MPN/100 ml) and a steady state maximum, based on a 30-day running geometric mean (≤35 MPN/100). Advisories urge users to abstain from swimming, but do not officially "close" the water body to recreational use. The Program disseminates swim advisories by website postings, and by opening pole-mounted signs which are installed at the beach monitoring sites. When water quality sample results indicate that bacteria levels at beach sites under swim advisories are once again compliant with the advisory criteria, the public is notified that the advisory has been lifted through beach signage and the website (https://ldh.la.gov/page/288).

2021 Program Accomplishments

During 2021, Louisiana's BEACH Program:
1. Monitored all accessible sample sites designated for monitoring in accordance with the requirements of their tier assignment throughout the swimming season except for sample sites on Elmer's Island and Grand Isle, which were closed from August 29, 2021, through the end of the 2021 season due to Hurricane Ida; and
2. Continued to meet or exceed the quality assurance/quality control goals established in the Program's QAPP (LDH 2021).

CHAPTER 2 - Update of BEACH Program

Review of Beach Rankings

In 2003, the CEHS completed a systematic process to identify and rank Louisiana's beaches according to risk. The process consisted of the following steps (LDHH 2003):

1. Identification and definition of coastal recreation waters;
2. Identification of beaches or similar points of access used by the public for swimming, bathing, surfing, or similar water contact activities;
3. Review of available information on levels of potential fecal contamination at beaches and intensity of beach use; and
4. Ranking of beaches to decide which beaches would be included in Louisiana's BEACH Program.

Based on levels of beach use and perceptions of water quality from estimated fecal coliform densities in adjacent waters, a qualitative ranking scheme was devised and used to assign each beach to an appropriate monitoring tier. The monitoring tiers define levels of monitoring and public notification such that beaches with a greater density of swimmers, and thus a greater number of people at risk, receive a higher intensity of monitoring and public notification than lower use beaches. Monitoring and public notification procedures are the same at Tier 1 and Tier 2 beaches, but sample station density differs. Sample stations are closer together at Tier 1 beaches, no more than 500 meters apart, while sample stations are no more than 2 miles apart on continuous beach segments at Tier 2 beaches. Sample stations at Tier 3 and 4 beaches are at the same density as Tier 2 beaches, but samples are not collected weekly, and accordingly, weekly public advisories are not issued for Tier 3 and 4 beaches. Tier 4 beaches meet the same criteria specified for Tier 3 beaches, which are described below, but due to very limited primary contact recreation use and historically good water quality, are not monitored.

The initial assignments of beach segments to monitoring Tiers was completed in 2003 (LDHH 2003). The estimated number of swimmers at each beach was based on information obtained primarily from law enforcement officials responsible for patrolling the beach and from park managers. The officials provided estimates of the number of beach visitors on a typical weekday, weekend, and holiday during the peak swimming season, May 1 through Labor Day, along with an estimate of the percentage of beach users entering the water. These estimates were combined by adding typical weekday and weekend use to provide an estimate of weekly use. Weekly use was multiplied by the number of weeks in the recreational period and added to the estimated number of holiday visitors during Memorial Day, Fourth of July, Labor Day, and any other beach-specific major events. Because the resulting total was an estimate of unknown precision, those estimates were generalized into broad categories of use for relative comparison as follows:

Category of Use	Estimated Number of Swimmers Annually
Very Low	<5,000
Low	5,000 to <10,000
Moderate	10,000 to <15,000
High	15,000 to 20,000
Very High	>20,000

Because beach water quality was either inferred from the water quality of the surrounding area or based on a brief period of data, and no studies were available providing a model of the site-specific relationship between fecal coliform concentrations and illness rates, the qualitative ranking process relied primarily on beach use. Beaches classified as having very high, or high were assigned to Tier 1 and receive the most monitoring attention. Beaches classified as having moderate use were assigned to Tier 2. Beaches with low or very low use were assigned to Tier 3 and targeted for additional bacterial indicator monitoring to better characterize risk. Beaches on private land or with existing swimming advisories posted by the State, and with very low public use were excluded from further consideration. A total of 29.16 miles of beach were considered for monitoring under Louisiana's BEACH Program, of which 23 miles were assigned to a monitoring tier (LDHH 2003).

CEHS anticipated that beach use and water quality could change through time and planned to re-evaluate beach rankings on an annual basis at the end of each swimming season (LDHH 2003). In 2006, it was decided that the Program would continue to evaluate risk primarily on the estimated density of swimmers at a beach in accordance with the original categories of use described above, but a new method of assessing water quality risk was developed. The original assessment evaluated water quality based on estimated fecal coliform densities, which was the only beach specific indicator organism data available at the time. Data collected during 2004 and 2005 provided new information about water quality, including enterococci densities, which were not previously available. Because USEPA's chosen indicator organism for marine waters is enterococci, and because greater than 99.8% of all of Louisiana's swim advisories issued through 2005 involved exceedance of beach advisory enterococci criteria, new water quality categories based on enterococci densities were developed for use in the risk-based Tier assignment process (LDHH 2006).

A sample station's annual enterococci geometric mean density was strongly correlated with the percentage of monitored weeks under advisory, so a sample station's geometric mean is a good indicator of the likelihood of exceeding the established limits of acceptable risk. Accordingly, water quality risk categories were based on the ratio of a beach's annual enterococci geometric mean to the enterococci geometric mean decision criterion of 35 MPN/100 ml. Water quality risk categories were established as: "Lower Risk" if the beach's annual geometric mean/35 < 0.5; "Moderate Risk" if the beach's annual geometric mean/35 ≥ 0.5 and < 1; and "Higher Risk" if the beach's annual geometric mean/35 ≥ 1. Using the revised classification scheme, continuous beach segments were reassigned to Tier risk categories at the beginning of 2022 based on 2021 beach segment-specific enterococci geometric mean/35. Table 1 identifies the beaches that were monitored under the Program during 2021, their designated 2022 monitoring Tier, and associated

sample stations. Beach use during 2021 approximated historical levels except for Elmer's Island and Grand Isle beaches, which were closed to the public beginning August 29, 2021, due to Hurricane Ida. Elmer's Island and Grand Isle beaches remained closed through the end of the 2021 swimming season due to hurricane-related damages and debris.

Table 1. Continuous beach segments, beach miles, monitoring Tier assignments for 2021 and 2022, and sample stations.

Continuous Beach Segments	Designated Beach Miles	First Year Sampled	2021 Designated Monitoring Tier[2]	2021 Actual Monitoring Tier[2]	2022 Designated Monitoring Tier[2]	Sample Station State IDs[1]
Lake Pontchartrain Basin Beaches						
Fontainebleau State Park	0.15	2004	1	1	1	FONT1
Barataria River Basin Beaches						
Elmer's Island	0.31	2012	1	1	1	ELMR1
Elmer's Island-East	1.96	2012	4	4	4	ELMR2
Grand Isle State Park	1.15	2004	1	1	1	GISP1-4
Grand Isle Beach	6.15	2005	2	2	2	GIB1-3
Vermilion-Teche River Basin Beaches						
Cypremort Point State Park	0.45	2004	1	1	1	CYPT1
Calcasieu River Basin - Lake Charles Beaches						
North Beach - Lake Charles	0.43	2009	1	1	1	LCNB1
Calcasieu River Basin - Cameron Beaches						
Holly Beach	3.45	2005	1	1	1	HOLLY1-6
Mermentau River Basin Beaches						
Rutherford Beach	1.52	2005	2	2	2	RUTH1
Sabine River Basin Beaches						
Constance Beach Complex (CNSTBC)	6.29	2005	2	2	2	CNST1, DUNG1, GBRZ1, LTFL1, MART1

Note: [1] Sample station names, USEPA IDs and locations are provided in Appendix A.; [2] Tier assignments based on risk categorization; Tier 4 indicates a tier 3 beach that is used by the public and is not monitored.

During 2021, six continuous beach segments were designated as Tier 1 beaches and scheduled for monitoring (Grand Isle, Cypremort Point, and Fontainebleau State Parks; Elmer's Island, Holly Beach, and North Beach in Lake Charles), and three continuous beach segments were designated as Tier 2 (Grand Isle Beach, Rutherford Beach, and the Constance Beach Complex). All beach segments were monitored at their designated tiers during 2021. Elmer's Island East (ELMR2) was assigned to Tier 4 for the 2021 swim season due to very low usage and lower risk water quality in accordance with EPA guidance (the beach is used by the public but not monitored).

In summary, during 2021, the Program monitored all six continuous Tier 1 beach segments (approximately 6 beach miles), including sampling and public notification at all 14 of the Tier 1

sample stations (Table 2). Three Tier 2 continuous beach segments totaling approximately 14 miles were also monitored during 2021, including sampling and public notification at all 9 sample stations. One Tier 4 sample station on Elmer's Island East (ELMR2) was not scheduled to be monitored during 2021.

Table 2. Number of continuous beach segments, sample stations, and beach miles monitored by Tier during 2021 and planned for 2022.

Tier	2021 (Actual)				2022 (Projected)			
	1	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Number of Continuous Beach Segments	6	3	0	1	6	3	0	1
Number of Sample Stations	14	9	0	1	14	9	0	1
Total Beach Miles	6	14	0	2	6	14	0	2
Number of Continuous Beach Segments Monitored	6	3	0	0	6	3	0	0
Number of Sample Stations Monitored	14	9	0	0	14	9	0	0
Total Beach Miles Monitored	6	14	0	0	6	14	0	0

In anticipation of the 2022 swimming season, as in past years, monitoring tier assignments were reviewed for all beaches based on expected use levels and historical water quality. It is anticipated that use levels and patterns will remain at approximately historical levels for all beaches.

Using water quality data pooled across sample stations within continuous beach segments, water quality risk categories were calculated for each continuous beach segment for use in establishing 2022 Tier assignments (Table 3). Two systems of beach water quality assessment were used, the Louisiana BEACH Program's beach risk classification, as described above, and the World Health Organization's (WHO) risk categorization system. The WHO's microbial water quality assessment criterion (WHO 2003) was applied to the last three years (2019–2021) of Louisiana's water quality data. In addition to water quality, the WHO classification system uses sanitary inspection categories to classify waters from very good to very poor, depending on the beach's susceptibility to fecal influence as determined by a sanitary survey, but only the microbial criterion was evaluated for the purposes of this report. Rather than rely on the annual enterococci geometric mean for its microbial criterion, the WHO uses the parametric 95th percentile of observed enterococci densities over a longer-term period, typically a minimum of three years. The WHO selected the 95th percentile because it is easily understood and reflects much of the top-end variability in the distribution of water quality data that are of greatest public health concern and is robust against periodic variation in water quality. The WHO classifies water quality into four categories based on enterococci density (cfu/100 ml) and the associated risk of acquiring gastrointestinal illness as follows: A) <1 case in 100 exposures, 95th percentile ≤40 cfu/100 ml; B) between 1 and 5 cases in 100 exposures, 95th percentile 41-200 cfu/100 ml; C) between 5 and 10 cases in 100 exposures, 95th percentile 201-500 cfu/100 ml; and D) >10 cases in 100 exposures, 95th percentile >500 cfu/100 ml. For comparison, the USEPA's gastrointestinal illness rate associated with the 1986 recommended beach advisory enterococci criteria for marine recreational waters is 19 illnesses per 1,000 swimmers and the 2012 recommended enterococci

criteria is 32-36 gastrointestinal illnesses per 1,000 swimmers, both of which falls within WHO category B. To facilitate comparison with Louisiana's risk categories, we have categorized WHO classes A and B as lower risk, C as moderate, and D as higher risk.

Table 3. Beach water quality and use risk categories for 2022 swimming season based on anticipated use in 2022 and 2021 water quality data.

Beach	Anticipated 2022 Use	2021 Entero. Geometric Mean	2021 Entero. Geometric Mean / 35	2021 Water Quality Risk Cat.	Entero. 95th Parametric Percentile 2019-2021	WHO Risk Category[1]
CNSTBC	Low	33.6	96%	Moderate	175	B
CYPT	Mod.-High	51.9	148%	Higher	542	D
ELMR	High	29.5	84%	Moderate	139	B
FNTB	High	38.7	111%	Higher	853	D
GIB	Moderate	22.4	64%	Moderate	89	B
GISP	Very High	37.0	106%	Higher	124	B
HOLLY	Mod.-High	38.0	109%	Higher	247	C
LCNB	Very High	124.8	357%	Higher	1019	D
RUTH	Very Low	75.2	215%	Higher	514	D

Note: [1] WHO risk categorization based on 2019-2021 water quality data due to the requirement for a three-year evaluation term (risk categories previously defined in body of the report).

Water quality calculated using the Louisiana and the WHO risk categorization systems generally agreed for higher risk beaches but differed for moderate or lower risk beaches. The differences between the two categorization schemes result from using different time periods (Louisiana's risk categorization uses only the prior year, where the WHO uses three prior years), and metrics (geometric mean versus 95th percentile). Using the modified WHO risk categorization results, four continuous beach segments were classified in the B WHO risk category (Constance Beach Complex, Elmer's Island, Grand Isle beaches, and Grand Isle State Park), one in risk category C (Holly Beach), and four in risk category D (Cypremort Point State Park, Fontainebleau State Park, Lake Charles North Beach, and Rutherford Beach). In contrast with the modified WHO categorization, Louisiana's risk categorization resulted in no continuous beach segments classified in the lower water quality risk category, three in the moderate risk category (Constance Beach Complex, Elmer's Island, and Grand Isle beaches) and six in the higher risk category (Cypremort Point and Fontainebleau State Parks, Grand Isle State Park, Holly Beach, Lake Charles North Beach, and Rutherford Beach).

The Louisiana BEACH Program's beach risk classification was selected for use in assigning beaches to tiers. Combined 2022 anticipated use and 2021 water quality rankings for each continuous beach segment are given in Table 4. As discussed above, tier categories remain based on the same swimmer density categories that were used in the original tier designation system, but low and very low use categories are designated as "Discretionary." For "Discretionary" beach segments, the Louisiana BEACH Program Manager will decide if Tier 2, 3 or 4 level monitoring is warranted at any time during the monitoring season. Because of the very low to

low use at Constance Beach Complex and Rutherford Beach, but Higher Risk water quality determination based on 2021 water quality data, it is anticipated that they will remain Tier 2 beaches during 2022; therefore, all 2021 beach tier assignments are expected to remain in place for 2022 as shown in Table 1. Elmer's Island East (ELMR2) will not be monitored during 2022 due to continued very-low use and is designated as a Tier 4 beach. Therefore, the Program is expected to monitor all Tier 1 beaches totaling 5.8 beach miles, all Tier 2 beaches totaling 14 miles, and 0 of approximately 1.9 Tier 4 beach miles (Table 2) in 2022.

Table 4. Combined beach use and water quality risk categories for 2022.

		Lower Risk	Moderate Risk	Higher Risk	
▲	**VH**			GISP, LCNB	**Tier 1**
# of Swimmers =	**H**		ELMR1	CYPT, FNTB, HOLLY	
	M		GIB		**Tier 2**
	L		CNSTBC[2]		**Tier3**
	VL		ELMR2[3]	RUTH[4]	
		Discretionary			

Notes: [1]Water quality risk level based on 2021 data using Louisiana's risk classification. [2]CNSTBC will be monitored as tier 2 during 2022. [3]ELMER2 is classified as a Tier 4 beach for 2022 because very low use and historically Lower Risk water quality and will not be monitored in 2022. [4]RUTH will be monitored as a tier 2 beach during 2022.

In addition to annually re-evaluating risk levels and associated tier designations for beach segments monitored during the previous year, the program determines if any additional beaches warrant monitoring. No additional beaches were identified for inclusion under the Program in 2022.

Program Modifications

Elmer's Island and Grand Isle beaches and State Park were closed due to Hurricane Ida from August 29, 2021, through the end of the 2021 swimming season. It is anticipated that access to Elmer's Island and Grand Isle beaches and State Park will be reestablished in 2022 and monitoring will resume. No other modifications were made to the Program's procedures, methods, or decision rule during 2021. The Program followed the procedures, methods and decision rule summarized in *Louisiana's BEACH Program Quality Assurance Project Plan,* which is available on the World Wide Web at https://ldh.la.gov/page/288.

CHAPTER 3. Louisiana BEACH Program's 2021 Results

Number of Samples Collected

Between 1 April 2021 and 31 October 2021, a total of 597 samples were collected at 23 sample stations (see Table 5), distributed among four sample types: field duplicates and splits, resamples, and routine samples. Each type of sampling is described below.

Table 5. Total number of samples collected by sample station and sample type during 2021 by Louisiana's BEACH Program.

Sample Station	Sample Type				Station Total
	Field Duplicate	Field Split	Resample	Routine	
CNST1	1	0	0	26	27
CYPT1	2	2	0	26	30
DUNG1	4	0	0	26	30
ELMR1	0	3	0	20	23
FNTB1	0	3	0	25	28
GBRZ1	2	1	0	26	29
GIB1	1	1	0	20	22
GIB2	0	2	0	20	22
GIB3	2	1	0	20	23
GISP1	2	1	0	20	23
GISP2	0	0	0	20	20
GISP3	1	0	0	20	21
GISP4	0	0	0	20	20
HOLLY1	1	2	0	26	29
HOLLY2	1	2	0	26	29
HOLLY3	1	0	0	26	27
HOLLY4	1	0	0	26	27
HOLLY5	2	1	0	26	29
HOLLY6	2	0	0	26	28
LCNB1	2	1	0	26	29
LTFL1	0	0	0	26	26
MART1	2	0	0	26	28
RUTH1	0	1	0	26	27
Sample Type Total	**27**	**21**	**0**	**549**	**597**

Routine samples are the regularly scheduled weekly samples collected during the designated monitoring period at beaches that are officially part of the Program. Of the 690 scheduled routine

samples, 549 were collected (80%) across 23 sample locations monitored during 2021. During the week of May 16, 2021, scheduled sampling at all 23 sample locations was missed due to severe storms resulting in unsafe sampling conditions during that week. Hurricane Ida struck the Louisiana coast on August 29, 2021, closing Elmer's Island (ELMR1) and Grand Isle beaches (GIB1-3 and GISP1-4) for the balance of the swimming season, resulting in 72 missed samples. Hurricane Ida also disrupted sampling at the remaining 15 sampling locations from August 29, 2021, through the week of September 19, 2021, resulting in 46 missed routine samples.

Resamples are collected at the BEACH Program Manager's discretion when a routine sample has an unexpectedly high indicator organism density or when the source of an exceedance is known and has been corrected and extra samples are required to calculate a post-event geometric mean. There were no resamples collected during 2021.

Field duplicates and field splits are two types of quality control (QC) samples. Field duplicates were used to estimate the precision of sampling methods by comparing laboratory results for two samples taken consecutively on the same day at the same sampling site (i.e., one grab is considered the routine sample or resample and the other the QC sample). Field splits were used to estimate the precision of laboratory analyses (intra-laboratory) plus any variability induced during sample handling and transport by analyzing two aliquots of the same water sample (i.e., one-half of the split sample is considered the routine sample or resample and the other half the QC sample), which were subdivided in the field. Louisiana's BEACH Program QAPP requires that approximately 10% of scheduled sample events be designated as quality control samples, which are selected at random at the beginning of the sampling period in approximately equal proportions ($\approx$ 5% each) of field duplicate and field split samples. QC samples may also be collected during resample events to improve the precision of estimated indicator organism densities by averaging resample and QC sample results. A total of 50 QC samples were scheduled to be collected concurrent with the 549 routine samples and were to consist of 26 field duplicates and 24 field split samples. A total of 27 field duplicates and 21 field split samples were collected during 2021. Twenty-four (24) field duplicates were sampled as scheduled (92%), and 20 field split samples were collected as scheduled (83%), resulting in 88% of QC samples collected as scheduled. No QC samples were missed when scheduled, but three field duplicates were sampled as field splits and one field split was sampled as a field duplicate. Accordingly, 48 of the 50 (96%) anticipated QC samples were collected.

Of the 597 total samples, all were collected during the designated monitoring period, and those collected at Tier 1 and 2 beaches were used to make weekly water quality decisions. For analysis purposes, samples collected on the same date at the same location were not considered independent, and were averaged together (i.e., arithmetic mean) resulting in a total of 549 independent samples collected during the 2021 designated monitoring season (see Table 6).

Summary Statistics for 2021 Designated Monitoring Period Samples

Results of enterococci density (MPN/100ml) and salinity (parts-per-thousand; ppt) for each sample location during the 2021 designated monitoring period are summarized in Table 7 and depicted graphically in Figures 1 and 2. Because indicator organism densities are lognormal

distributed, Table 7 presents $\log_e$ mean and $\log_e$ standard deviations; exponentiation of the $\log_e$ mean produces the geometric mean on the nominal scale. Note that the $\log_e$ enterococci median shown in the graph and $\log_e$ mean in Table 7 are approximately equal as would be expected for lognormal distributed populations.

Table 6. Number of independent samples collected by sample station during the 2021 monitoring season (1 April – 31 October). Samples collected at the same station on the same day are counted as a single sample.

Sample Station	Number of Samples
CNST1	26
CYPT1	26
DUNG1	26
ELMR1	20
FNTB1	25
GBRZ1	26
GIB1	20
GIB2	20
GIB3	20
GISP1	20
GISP2	20
GISP3	20
GISP4	20
HOLLY1	26
HOLLY2	26
HOLLY3	26
HOLLY4	26
HOLLY5	26
HOLLY6	26
LCNB1	26
LTFL1	26
MART1	26
RUTH1	26
Totals	**549**

Table 7. Summary statistics for enterococci density (MPN/100ml), and salinity for samples collected during the 2021 designated monitoring season by sample station.

State ID	Enterococci			Salinity (ppt)		
	Geo. Mean	Log$_e$ Mean	Log$_e$ St. Dev.	Mean	St. Dev	n
CNST1	25.8	3.25	1.25	18.9	5.6	26
CYPT1	51.9	3.95	1.31	2.5	3.1	26
DUNG1	53.3	3.98	1.62	18.8	5.4	26
ELMR1	29.5	3.39	1.69	17.5	3.8	20
FNTB1	38.7	3.66	1.13	1.0	0.7	25
GBRZ1	25.3	3.23	1.02	19.1	5.6	26
GIB1	23.6	3.16	1.14	18.0	5.0	20
GIB2	23.7	3.17	1.35	18.2	4.7	20
GIB3	20.1	3.00	1.06	18.2	4.6	20
GISP1	34.2	3.53	1.45	17.0	4.4	20
GISP2	35.4	3.57	1.50	17.0	4.5	20
GISP3	42.7	3.75	1.46	17.1	4.6	20
GISP4	36.2	3.59	1.47	16.6	5.0	20
HOLLY1	34.2	3.53	1.57	18.6	5.7	26
HOLLY2	33.8	3.52	1.39	18.7	5.7	26
HOLLY3	43.9	3.78	1.39	18.6	5.7	26
HOLLY4	37.9	3.64	1.42	18.5	5.6	26
HOLLY5	36.0	3.58	1.43	18.6	5.6	26
HOLLY6	43.7	3.78	1.55	18.7	5.6	26
LCNB1	124.8	4.83	1.59	1.1	1.2	26
LTFL1	32.7	3.49	0.95	19.3	5.6	26
MART1	37.3	3.62	1.16	19.3	5.7	26
RUTH1	75.2	4.32	1.39	17.2	5.7	26
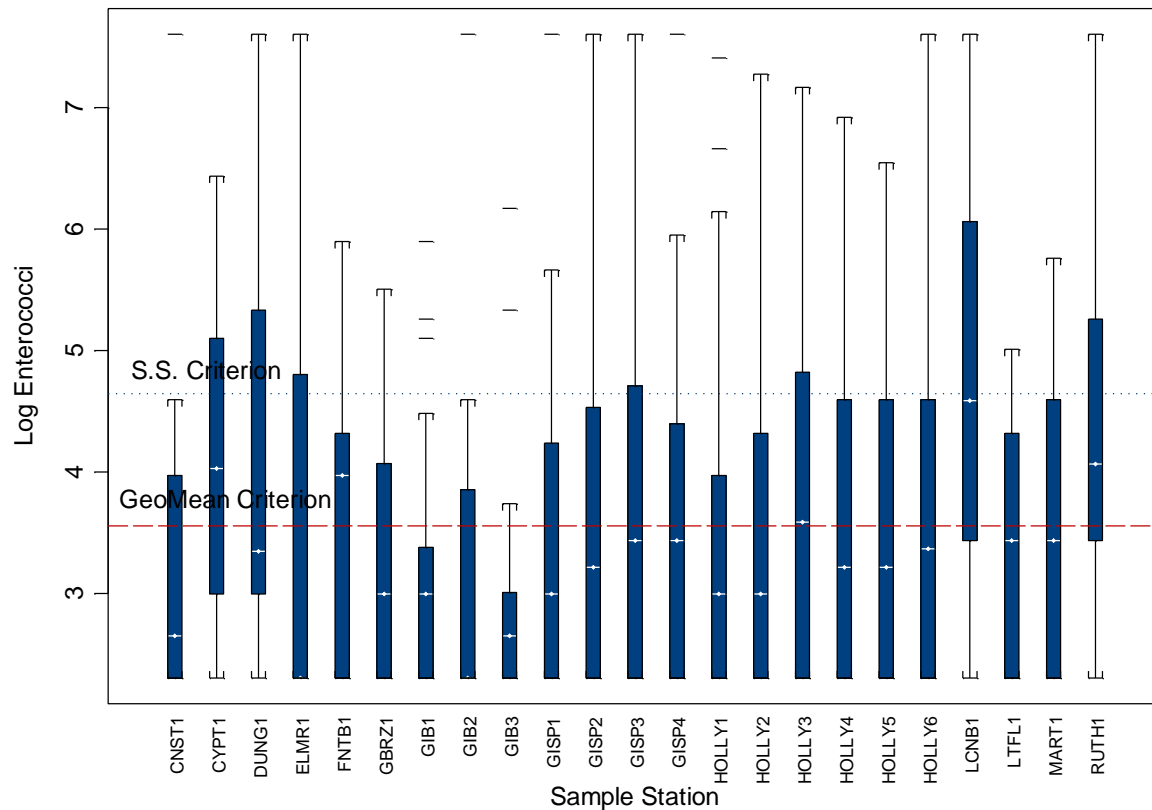
Figure 1. The distribution of log$_e$ transformed enterococci densities (MPN/100ml) by sample station relative to the geometric mean (GeoMean) and single sample (S.S.) maximum criteria for samples collected during the 2021 designated monitoring season. The box represents the inner quartile range (25th to 75th percentiles), and upper and lower whiskers extending from the box represent the smallest and largest observations within one step (1.5 times inner quartile range). The median (◊) is marked by a line through the box, and horizontal bars (—) represent extreme values.
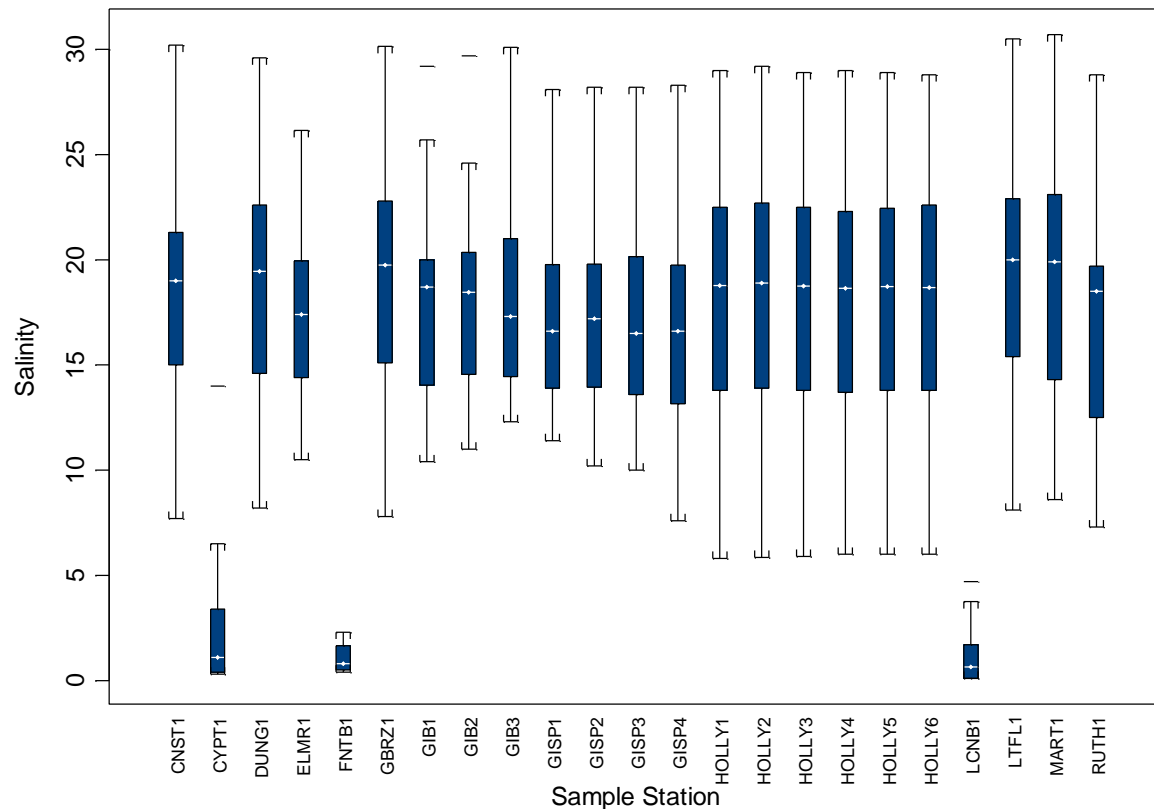
Figure 2. The distribution of salinity (ppt) by sample station for samples collected during the 2021 designated monitoring season.

Time-Series of 2021 Designated Monitoring Period Samples

In addition to calculating summary statistics for each sample station over the 2021 designated monitoring period, results are presented as a time-series (Appendix B, Figures B.1 through B.23; data for each sample event is provided in Appendix C). Because sample results were used during the designated monitoring season to make weekly determinations of whether water quality at each sample station met the Program's beach advisory criteria for Tier 1 and 2 beaches, sample results and the running 30-day geometric mean are shown in the figures. In each week, the last enterococci sample of the week and the running 30-day geometric mean for enterococci must both be less than or equal to their respective criterion for the sample station to be classified as in compliance. If either criterion was exceeded, the sample station was classified as out of compliance and a swimming advisory was issued. The advisory remained in effect until the most recent sample results and the running geometric mean were each less than or equal to their respective criterion.

Weekly Decision Rule Outcomes

During the 2021 swimming season (1 May – 31 October), 23 sample stations were monitored at nine Tier 1 or 2 continuous beach segments with a total of 51 advisories and 8 closures issued. Advisories were issued at all Tier 1 or 2 sample stations during 2021 based on observed exceedances of enterococci geometric mean and single sample maximum criteria (see Tables 8 and 9). Compliance at stations monitored throughout the swimming season varied between 79% of monitored days in compliance (GIB3), to a low of 4% (LCNB1). Across all monitored sample stations, 44% (1,647 of 3,702) of the 2021 swimming season's available station-days (monitored station-days not under closure) were in compliance and not under an advisory.

As in past years, most 2021 advisories were issued due to exceedances of the enterococci geometric mean criterion (Table 10). The enterococci GM was exceeded in 311 of 327 (95%) observed noncompliance station-weeks, with 206 (63%) of those noncompliance weeks resulting from enterococci geometric mean exceedances only, 105 (32%) resulting from both enterococci geometric mean and single sample maximum exceedances, and 16 (5%) resulted from exceedance of enterococci single sample maximum criterion alone.

As discussed in previous Louisiana BEACH Grant reports, Louisiana's percentage of station-weeks that were under advisory is not directly comparable with other states that do not use equivalent beach advisory criteria. Limiting comparison of advisory decision outcomes to sampled weeks, if Louisiana had used only the single sample maximum criterion (≤104 CFU/100mL) as some states have, Louisiana would have issued only 44% (132 of 301) of its 2021 advisories. Applying the Beach Action Value (BAV) criterion of 60 CFU/100mL[2] to Louisiana's 2021 monitoring results[3], 77% of the weekly advisory decisions would be unchanged, 20% of station-weeks placed under advisory for exceedance of Louisiana's criteria would be deemed in compliance, and 3% of 2021 station-weeks exceeded the BAV criteria but were in compliance with Louisiana's beach advisory criteria. Additionally, Louisiana's GM criterion identifies periods of likely high risk, which result in advisories being extended during weeks with missed samples.

When exceedances of beach advisory criteria were detected, an advisory was issued. To notify the public that a swimming advisory was in effect, the BEACH Program's monitoring/advisory sign at the sample site was opened and a notice of the advisory was placed on the OPH BEACH website (https://ldh.la.gov/page/288).

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[2] As recommended in *National Beach Guidance and Required Performance Criteria for Grants*, EPA-820-D-13-001, dated April 18, 2014.

[3] Analysis limited to the swimming season sampled week; Weeks without a sample were excluded from analysis.

Table 8. Advisory history by sample station and week for beach segments designated and monitored as either Tier 1 or Tier 2 beaches during the 2021 swimming season.

Station ID	Advisory Condition as of Midweek of Each Week - 2021 Swimming Season																										
	April	May				June					July				August				September					October			
	28	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	1	8	15	22	29	6	13	20	27
CNST1							A		A	A				A	A	A	A	A									
CYPT1		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A				A	A	A	A	A	A	A
DUNG1		A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A								
ELMR1							A		A	A	A	A	A	A	A	A	A	A	C	C	C	C	C	C	C	C	C
FNTB1						A	A	A	A	A	A	A	A	A	A	A					A	A	A	A	A	A	A
GBRZ1							A	A	A	A	A	A	A	A	A	A	A										
GIB1							A				A				A		A		C	C	C	C	C	C	C	C	C
GIB2											A	A	A	A	A				C	C	C	C	C	C	C	C	C
GIB3											A				A		A	A	C	C	C	C	C	C	C	C	C
GISP1			A				A				A	A	A	A	A	A	A	A	C	C	C	C	C	C	C	C	C
GISP2							A				A	A	A	A	A	A	A	A	C	C	C	C	C	C	C	C	C
GISP3							A				A	A	A	A	A	A	A	A	C	C	C	C	C	C	C	C	C
GISP4							A				A	A	A	A	A	A	A	A	C	C	C	C	C	C	C	C	C
HOLLY1						A	A	A	A	A	A	A	A		A	A	A	A	A	A	A						
HOLLY2						A	A	A	A	A	A	A			A		A	A	A	A	A						
HOLLY3		A				A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A					
HOLLY4						A	A	A	A	A	A	A	A		A	A	A	A	A	A	A	A					
HOLLY5					A	A	A	A	A	A	A	A			A		A	A	A	A	A						
HOLLY6						A	A	A	A	A	A	A			A	A	A	A	A	A	A						
LCNB1	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			A	A	A	A
LTFL1						A	A	A	A	A	A		A	A	A	A	A	A	A	A	A						
MART1		A				A	A	A	A	A	A	A	A	A	A	A	A	A	A								
RUTH1						A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			A	A	A	A

Notes: "**A**" indicates an advisory was in effect at the beach based on observed water quality data; "**C**" indicates a beach closure was in effect.

Table 9. Summary of 2021 advisories and closures.

State ID	Days Under Closure	% of Station-Days Under Closure	Days Under Advisory	% of Accessible Season Under Advisory	Days Under Closure or Advisory	% of Season Under Closure or Advisory	% of Available Season Open & In Compliance
CNST1	0	0%	55	30%	55	30%	70%
CYPT1	0	0%	159	87%	159	87%	13%
DUNG1	0	0%	119	65%	119	65%	35%
ELMR1	63	35%	73	61%	136	74%	26%
FNTB1	0	0%	113	62%	113	62%	38%
GBRZ1	0	0%	78	43%	78	43%	57%
GIB1	63	35%	30	25%	94	51%	49%
GIB2	63	35%	36	30%	99	54%	46%
GIB3	63	35%	25	21%	88	48%	52%
GISP1	63	35%	68	57%	131	72%	28%
GISP2	63	35%	60	50%	123	67%	33%
GISP3	63	35%	60	50%	123	67%	33%
GISP4	63	35%	60	50%	123	67%	33%
HOLLY1	0	0%	107	58%	107	58%	42%
HOLLY2	0	0%	92	50%	92	50%	50%
HOLLY3	0	0%	127	69%	127	69%	31%
HOLLY4	0	0%	114	62%	114	62%	38%
HOLLY5	0	0%	43	23%	43	23%	77%
HOLLY6	0	0%	107	58%	107	58%	42%
LCNB1	0	0%	176	96%	176	96%	4%
LTFL1	0	0%	107	58%	107	58%	42%
MART1	0	0%	106	58%	106	58%	42%
RUTH1	0	0%	144	79%	144	79%	21%
Totals	**507**	**12%**	**2055**	**56%**	**2562**	**61%**	**39%**

Table 10. Summary of weekly beach advisory decision rule exceedances by cause (2021).

Cause of Exceedance	Number of Observed Exceedances	% of Observed Exceedances
Only Enterococci geometric mean criterion exceeded	206	63.0%
Only Enterococci single sample max criterion exceeded	16	4.9%
Both Enterococci geometric mean and single sample max criteria exceeded	105	32.1%
Total	**327**	**100.0%**

Relationship between Indicator Organisms and Environmental Conditions

With each water sample collected by the BEACH Program, environmental variables were also collected, including surface water temperature (°F), salinity (ppt), tide conditions, weather conditions, and wind direction and speed. Total precipitation (in.) 0–24 hrs (precip0), 24–48 hrs (preciplag1), 48–72 hrs (preciplag2), and 72–96 hrs (preciplag3) prior to sample collection were estimated using rain basin precipitation values taken from Louisiana's Molluscan Shellfish database. Rain basins are the coastal portion of river basins to which nearby rain gauges were

associated; large basins (basins 2, 4, and 12) were split to limit the distance of associated rain gauges to <30 miles. Rain basin daily precipitation was estimated by averaging observed precipitation at rain gauges within the rain basin, and beaches were assigned to the rain basin in which they occurred. The number of days between sample collection and the most recent prior day with a precipitation record > 0 (DaysSinceLastRain) was estimated, and daily precipitation estimates were summed into measures of total precipitation within 0–48 hrs (precip48) and 0–72 hrs (precip72) prior to sample collection (these data are available upon request).

Using the observed environmental variables, estimated precipitation values and the associated $\log_e$ transformed enterococci densities collected by the Program from 2004 through 2009, CEHS performed a thorough statistical analysis to determine how indicator organism density was influenced by environmental factors at Louisiana's coastal beaches (the 2009 analysis). The results of the 2009 analysis confirmed the findings of previous reported analyses that there were no statistically meaningful differences among sample stations within continuous beach segments (StateID explains almost none of the variation in enterococci density), and that enterococci densities had changed from year to year at all beach segments except Fourchon, which had remained stable. The complete results of the 2009 analysis were reported in the *Louisiana BEACH Grant Report, 2009 Swimming Season*, which concluded that:

> "given the available data, it is unlikely that models that can reliably predict enterococci densities can be developed for Louisiana's beaches. Different environmental factors are most correlated with enterococci density for different beach segments and area groups, and no single environmental factor is useful in predicting indicator organism density. It also appears that the relationship between environmental factors and enterococci density is complex and will take more investigation to understand, requiring targeted studies that are not funded under current Beach Grants. Better measurement of the environmental variables that are currently being collected and/or collection of additional environmental measures may be required to adequately predict water quality from observable environmental conditions. Louisiana beaches are somewhat different from those of most coastal states in that they represent a wide range of salinity conditions, and most are relatively remote from urban runoff, reducing the direct association between environmental conditions and enterococci densities."

Through 2011, a total of 5,164 independent[4] samples were collected: 1,555 samples beyond those available in 2009. Given the additional data available, the analysis was repeated and yielded the same conclusions as were drawn following the 2009 analysis. That is, year-to-year differences in enterococci density at all beach segments other than FOUR was a significant source of variation, and that for most beach segments, the relationship between the environmental variables and enterococci density changed from year to year. Additionally, the observed year-to-year variation in enterococci density was not explained by corresponding differences in the environmental variables. Because of large year-to-year differences in enterococci densities and associated annual variance within beach segments, and annual differences in the relationship between enterococci density and the environmental variables as shown in the 2011 Annual Beach Report, developing useful statistical models that go beyond

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[4] For analysis purposes, single samples collected on a date at a sample location were considered independent; multiple samples collected on a date at a sample location were averaged together.

describing general patterns of association between environmental conditions and enterococci densities may not be possible for Louisiana's more remote beaches.

Figure 3 shows the considerable annual variation in enterococci densities within beach segments from Program inception through 2021 for those continuous beach segments monitored in 2021. Enterococci densities were relatively stable between 2020 and 2021 and comparable to recent years at Elmer's Island, Fontainebleau State Park, Grand Isle Beach, Holly Beach and Rutherford Beach, and higher at Constance Beach Complex, Cypremort Point State Park, Grand Isle State Park and Lake Charles North Beach. Salinity during 2021 was within the expected range and did not appear to influence water quality except for LCNB (Figure 4), which had low salinity and higher enterococci densities in both 2019 and 2021.
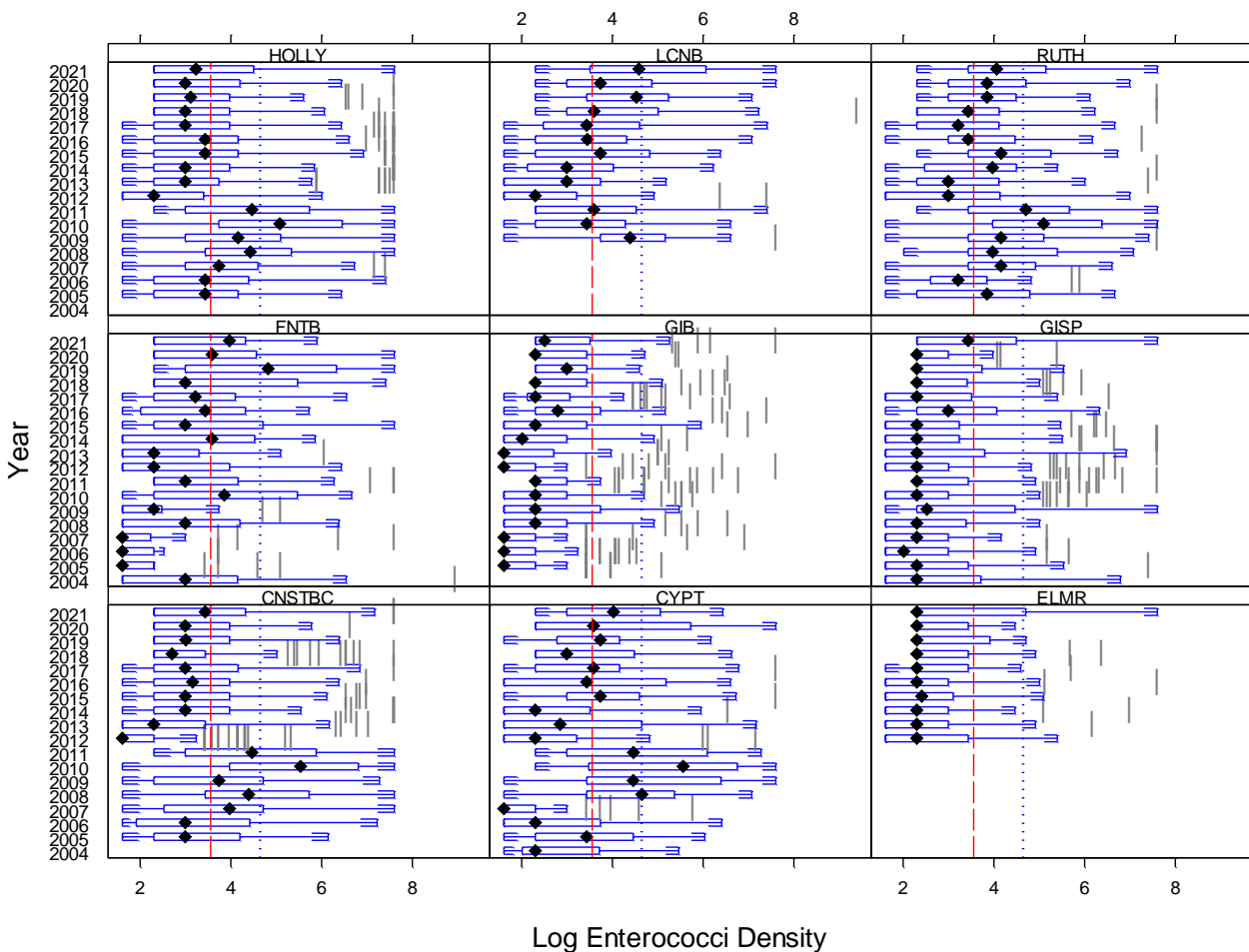
Figure 3. Distribution of log$_e$ enterococci densities by year within continuous beach segments relative to geometric mean criterion (red dashed lines) and single sample maximum criterion (blue dotted lines).
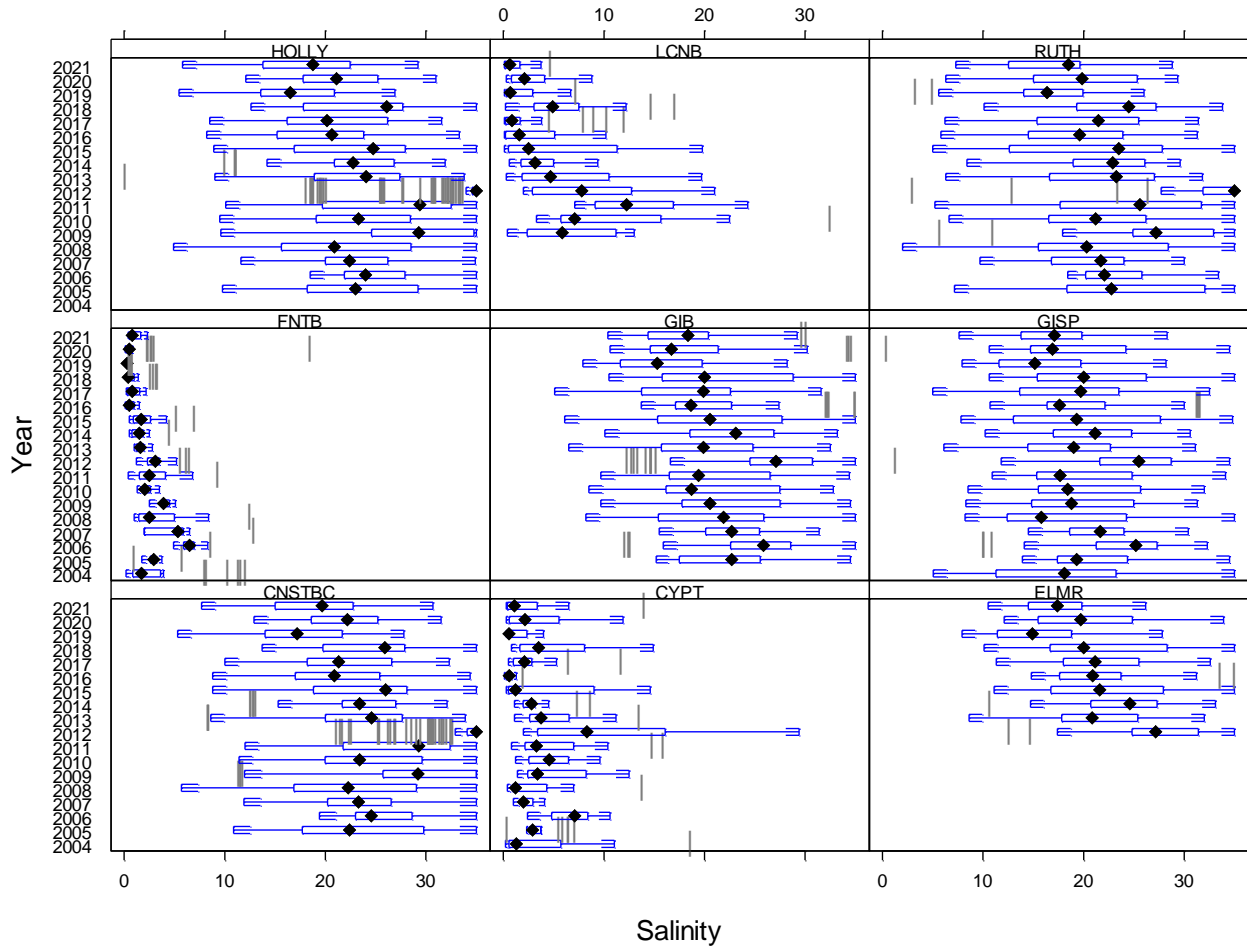
Figure 4. Distribution of salinity (ppt) by year within continuous beach segments.

CHAPTER 4. Evaluation of Program Performance Relative to Data Quality Objectives.

Louisiana's BEACH Program Quality Assurance Project Plan (LDH 2021) states that at the end of each year, the Program Manager shall audit the Program to determine if the Program's data quality objectives are being met. As described in the QAPP (see Table A7.1 of the QAPP), the Program's data quality objectives for those parameters measured in accordance with the QAPP are expressed in terms of precision and completeness goals. Those data quality objectives are repeated below in Table 11, together with their 2021 results.

Table 11. Data quality objectives and 2021 results.

Parameter	Concen-tration Units	QAPP Precision Goals (RPD)	2021 Precision Mean RPD (± 1 SE, n)	QAPP Completeness Goals	2021 Completeness
Enterococci	MPN/ 100ml	Sample 60%; lab 45%	Sample 58.4% (±10.0, 27); lab 58.9% (±11.6, 21)	98%	100%
Salinity	ppt	Sample 10%, lab 5%	Sample 6.7% (±6.0, 27); lab 4.9% (±2.4, 21)	98%	99.8%
Surface Water Temperature	°F	± 2°	± 2° by SOP	98%	99.8%
Tide Conditions	NA	NA	NA	98%	100%
Weather	NA	NA	NA	98%	100%
Wind Direction	NA	NA	NA	98%	100%
Wind Speed	NA	NA	NA	98%	100%
Precipitation	Inches/ previous 24 hours	NA	NA	98%	100%
River Stage	Feet on flood gauge	NA	NA	98%	100%

To evaluate compliance with the established data quality objectives (DQOs) for sample and laboratory precision on estimated indicator organism densities and salinity, the results from QC samples, which are always collected in conjunction with a routine sample or resample, were compared to the corresponding sample result. Prior to the start of the monitoring period, approximately 10% of scheduled routine samples were designated as quality control samples. QC samples were selected at random at the beginning of the sampling period in approximately equal proportions (~ 5% each) of field duplicate and field split samples. Field splits were designed to estimate the variability of the analysis process, or "lab" precision, plus any minor imprecision resulting from sample handling and transport. Field duplicates were designed to incorporate lab variability plus sampling variability to estimate the variability of collecting another sample at approximately the same place and time. Any unscheduled QC samples that were collected during routine sample events were also included in the QC evaluation.

Sampling and laboratory precision were estimated from each quality control sample by calculating the relative percent difference (*Sample RPD*) as follows:

$$Sample\ RPD = \frac{|C_1 - C_2|}{(C_1 + C_2)/2}\ x\ 100$$

where C_1 is the routine sample (or resample) result and C_2 is the quality control sample result. To estimate precision across samples, the mean and standard error of Sample RPDs were calculated. Note that the precision goals are expressed as means, and compliance with precision goals is assessed by determining if the observed precision is statistically different from the goal.

As described in Chapter 3, a total of 48 quality control samples were collected during 2021, consisting of 27 field duplicates and 21 field-split samples. To evaluate compliance with QAPP precision goals, means and standard errors of sample RPDs were calculated for the 2021 QC samples and are presented in Table 11. Figures 5-6 show Sample RPD results relative to precision goals; if the lower error bar (lower 95th percentile) shown in the graph is below the goal, then the goal has been achieved. All precision goals were achieved for 2021.
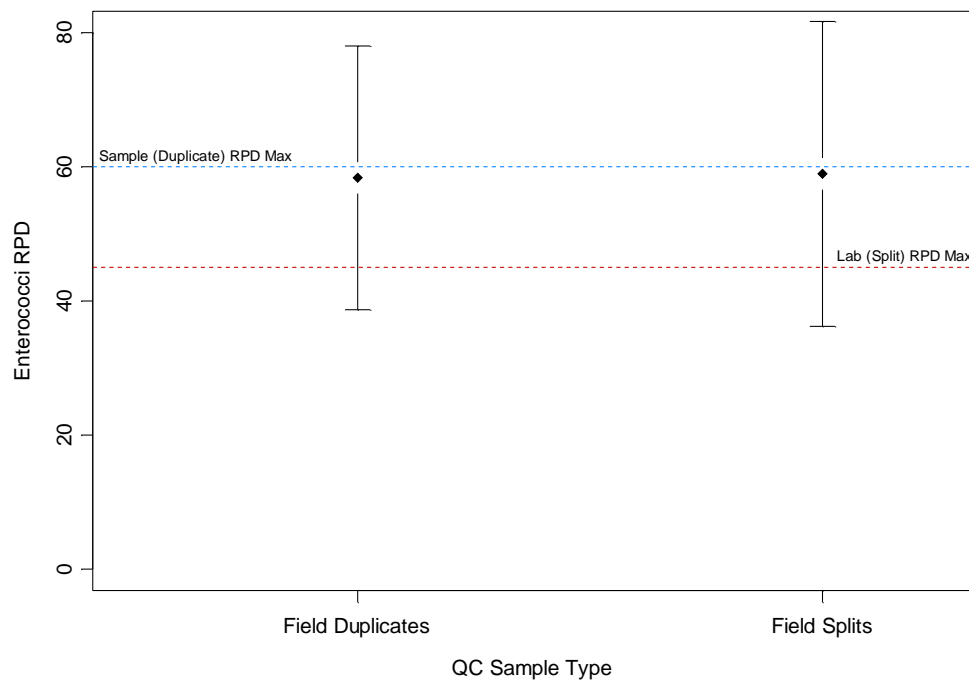
Figure 5. Comparison of 2021 monitoring season mean enterococci relative percent difference (RPD) for field duplicates and field splits with QAPP precision goals. Means are represented by diamonds and upper and lower 95th percentiles of the mean are shown as error bars.
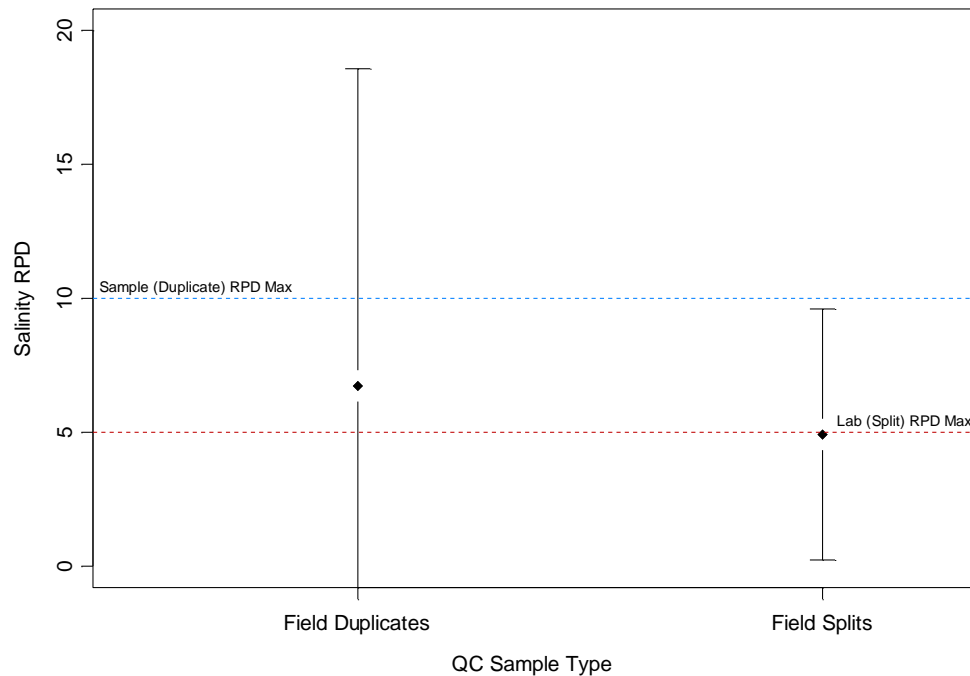
Figure 6. Comparison of 2021 monitoring season mean salinity relative percent difference (RPD) for field duplicates and field splits with QAPP precision goals. Means are represented by diamonds and upper and lower 95th percentiles of the mean are shown as error bars.

Completeness is the percentage of measurements made that are judged to be valid according to specific criteria and entered into the data management system. Percent completeness *(%*C) for measurement parameters was estimated as follows:

$$\%C = \frac{V}{T} \; x \, 100$$

where *V* is the number of measurements judged valid and T is the total number of measurements. During 2021, a total of 597 samples were successfully processed, and all results were considered valid and recorded in the Program's database.

Based on a thorough review of the data recorded for the 2021 season, all completeness goals were achieved, and there were no variances from the QAPP detected. In addition to the audit and data review described above, the BEACH Program Manager/Quality Assurance Officer verified throughout the 2021 sampling period that:

- All elements of the QAPP were being correctly implemented as prescribed;
- The quality of the data generated by implementation of the QAPP was adequate; and
- Corrective actions, when needed, were implemented in a timely manner and their effectiveness was confirmed.

All beach monitoring and notification data collected during 2021 have been uploaded to USEPA's BEACH (PRAWN) and Water Quality Data systems via submission of an XML formatted file to the Exchange Network Services Center.

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APPENDIX A

Sample Station Names, Locations, USEPA IDs and Location Maps

List of sample stations designated under the Louisiana BEACH Program by State ID, Beach Name, and USEPA IDs.

State ID	Beach Name	USEPA ID	Latitude	Longitude	Beach Length (miles)
CNST1	Constance Beach	LA134778	29.75874	-93.58030	1.40
CYPT1	Cypremort Point State Park	LA971783	29.73695	-91.85398	0.45
DUNG1	Long Beach	LA860482	29.75413	-93.62446	1.79
ELMR1	Elmer's Island - 1	LA834833	29.17515	-90.07414	0.31
ELMR2	Elmer's Island - 2	LA451844	29.18465	-90.05670	1.96
FNTB1	Fontainebleau State Park	LA733869	30.33554	-90.04550	0.15
GBRZ1	Gulf Breeze	LA725358	29.75696	-93.59099	0.73
GIB1	Grand Isle Beach - 1	LA430483	29.23291	-89.98940	3.06
GIB2	Grand Isle Beach - 2	LA325065	29.22006	-90.01364	1.81
GIB3	Grand Isle Beach - 3	LA799656	29.20716	-90.03206	1.28
GISP1	Grand Isle State Park - 1	LA240078	29.25956	-89.94976	0.49
GISP2	Grand Isle State Park - 2	LA221569	29.25513	-89.95265	0.26
GISP3	Grand Isle State Park - 3	LA204303	29.25232	-89.95545	0.24
GISP4	Grand Isle State Park - 4	LA186192	29.24972	-89.95828	0.16
HOLLY1	Holly Beach - 1	LA489985	29.76848	-93.43767	1.21
HOLLY2	Holly Beach - 2	LA829030	29.76882	-93.44417	0.36
HOLLY3	Holly Beach - 3	LA109442	29.76913	-93.44932	0.30
HOLLY4	Holly Beach - 4	LA697221	29.76912	-93.45425	0.30
HOLLY5	Holly Beach - 5	LA164373	29.76914	-93.45948	0.30
HOLLY6	Holly Beach - 6	LA467180	29.76907	-93.46424	0.98
LCNB1	North Beach	LA202517	30.23596	-93.23362	0.43
LTFL1	Little Florida	LA595220	29.75594	-93.60497	1.01
MART1	Martin Beach	LA135245	29.74891	-93.66383	1.36
RUTH1	Rutherford Beach	LA284049	29.75897	-93.12616	1.52
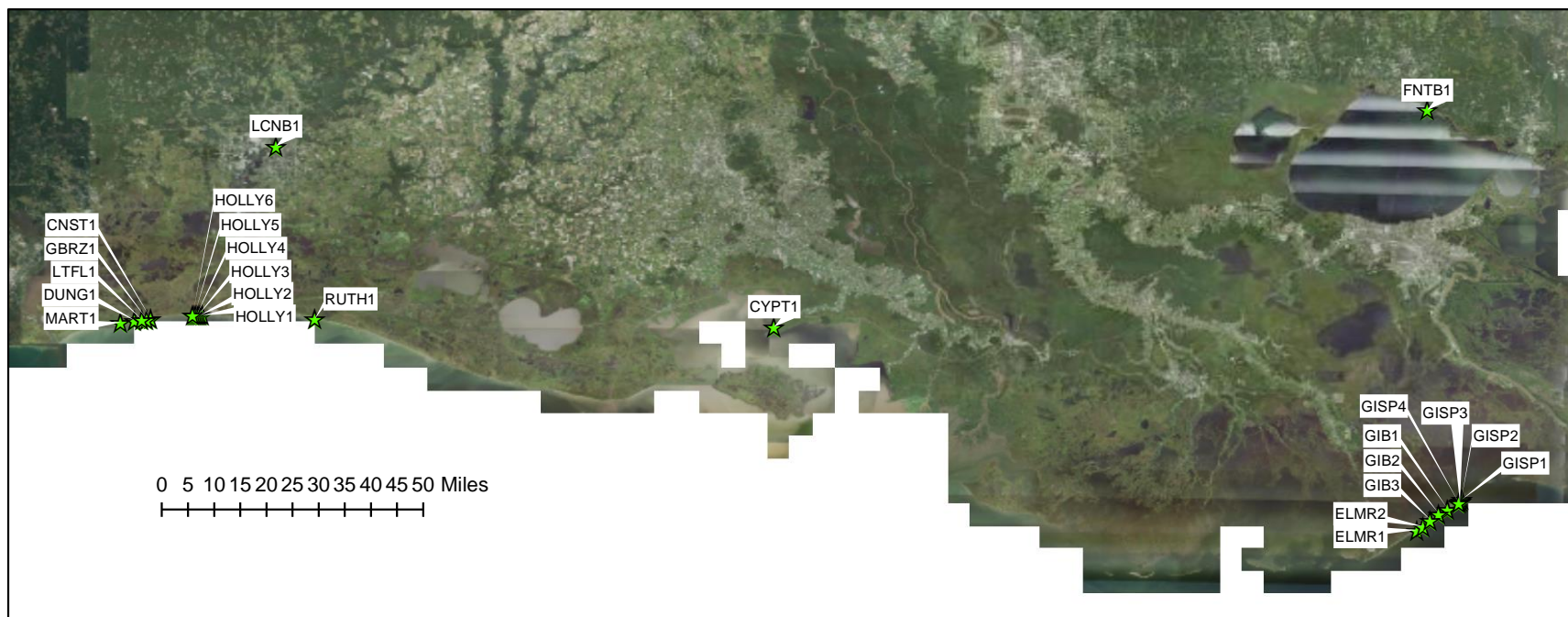
Area map of sample stations
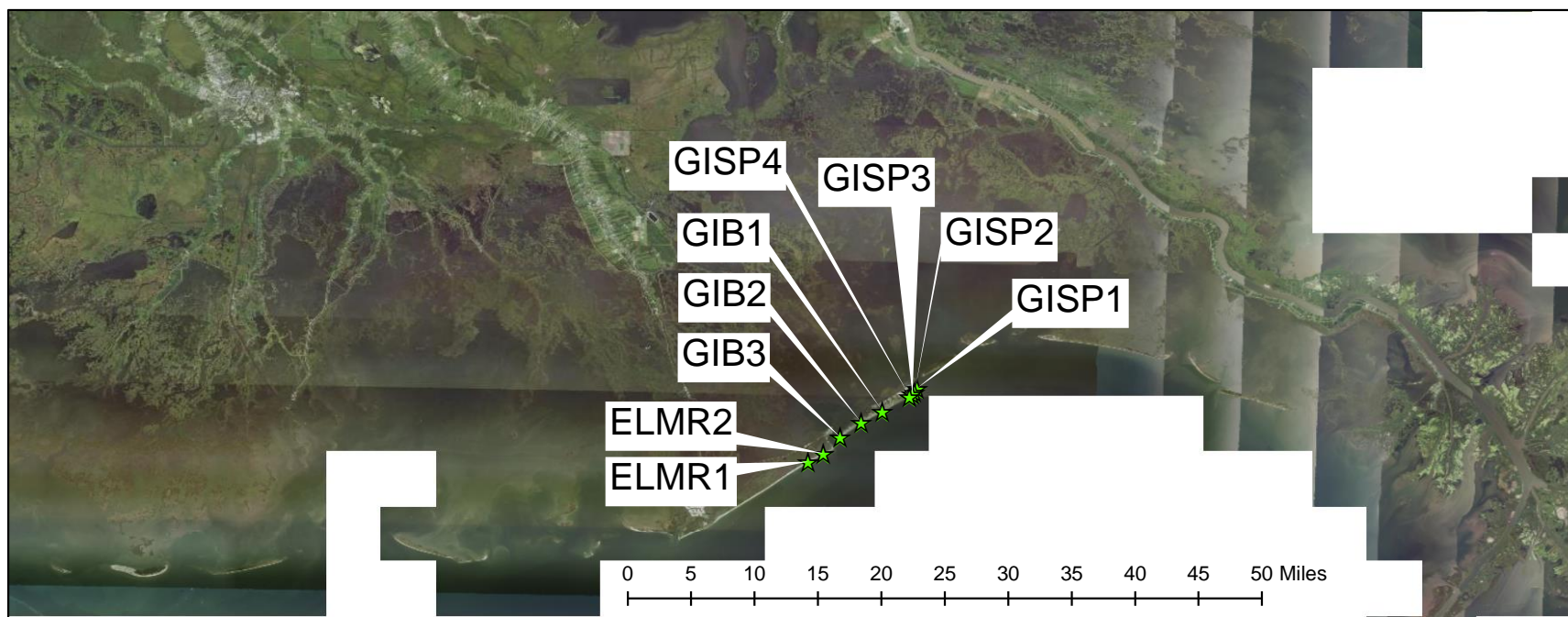
Map of Grand Isle area sample stations
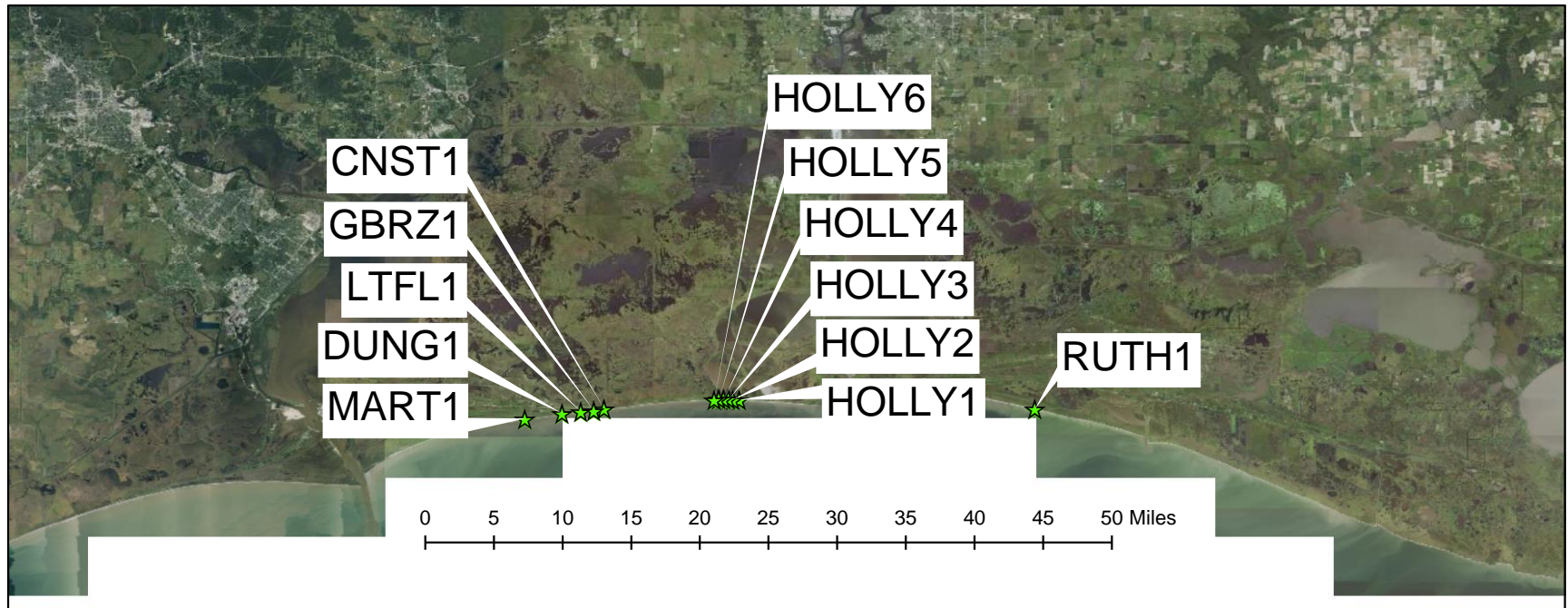
Map of Constance Beach Complex, Holly and Rutherford beaches.

APPENDIX B

**Time Series of Water Quality Results
By Sample Station**
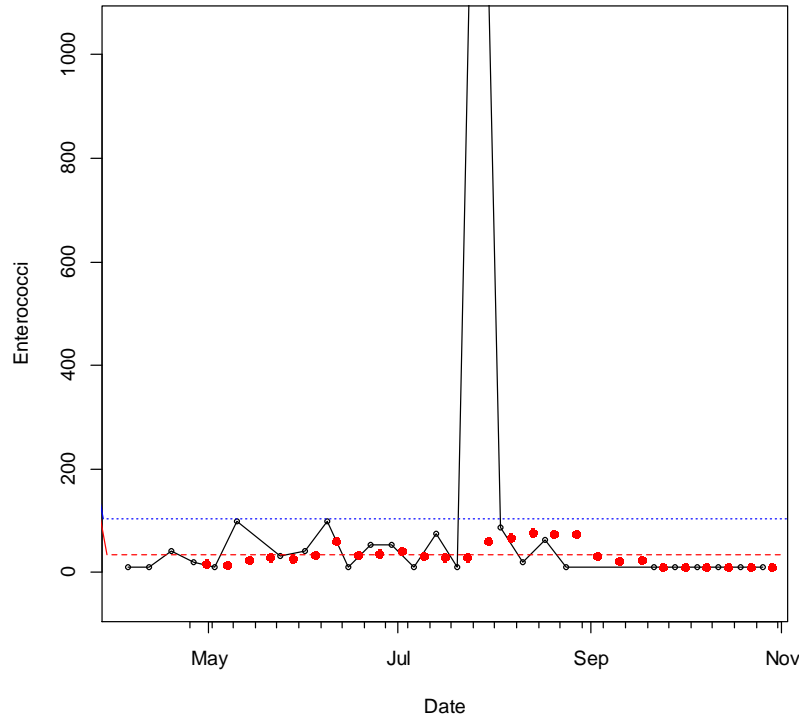
Figure B.1. Time series of enterococci sample results collected during 2021 at CNST1. Sample results are shown as open dots (○), running 30-day geometric means are shown as red dots (●), and geometric mean and single sample maximum criteria are shown as red and blue dashed horizontal lines, respectively.
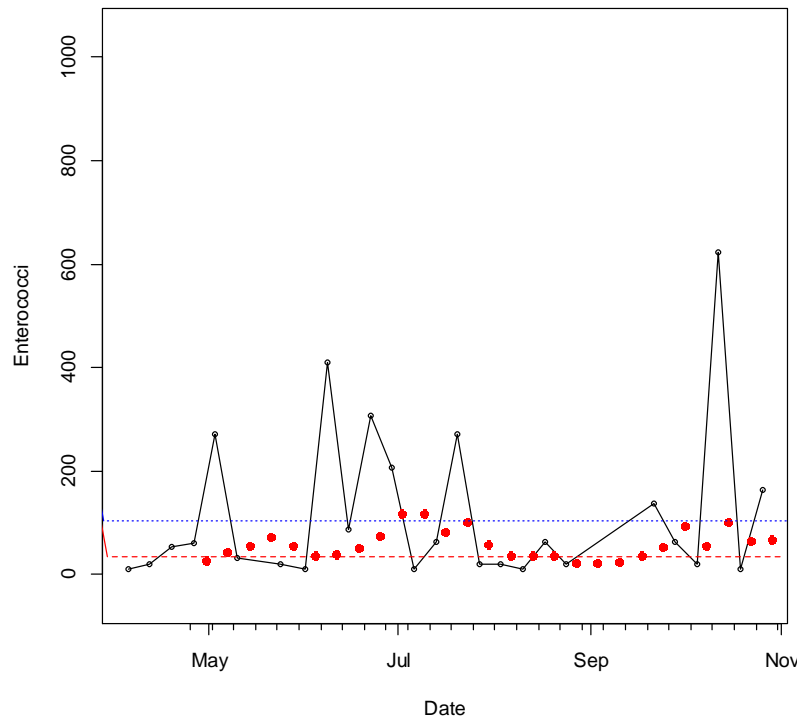
Figure B.2. Time series of sample results collected during 2021 at CYPT1.
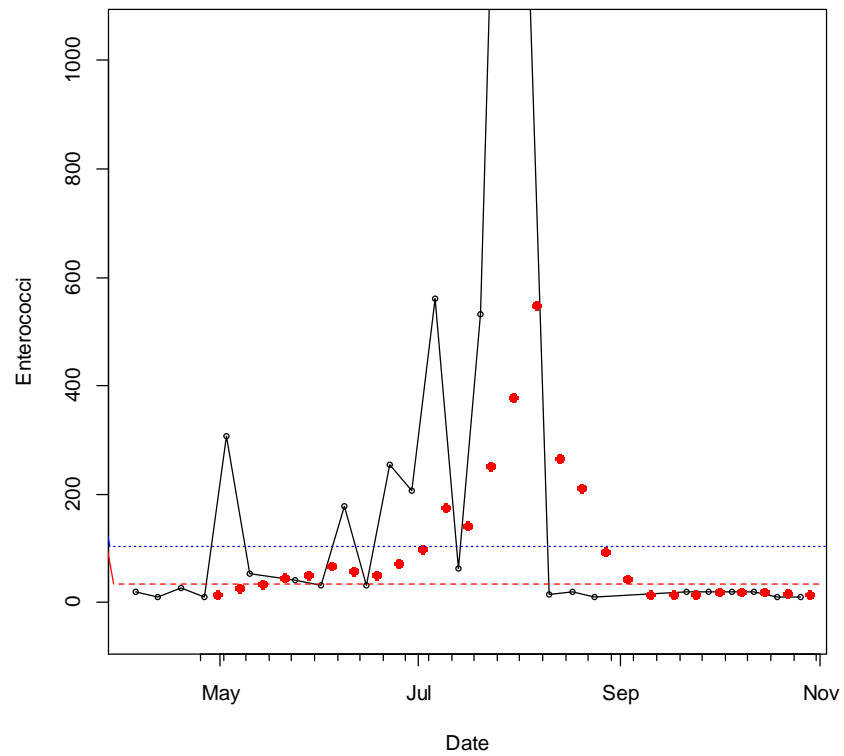
Figure B.3. Time series of sample results collected during 2021 at DUNG1.
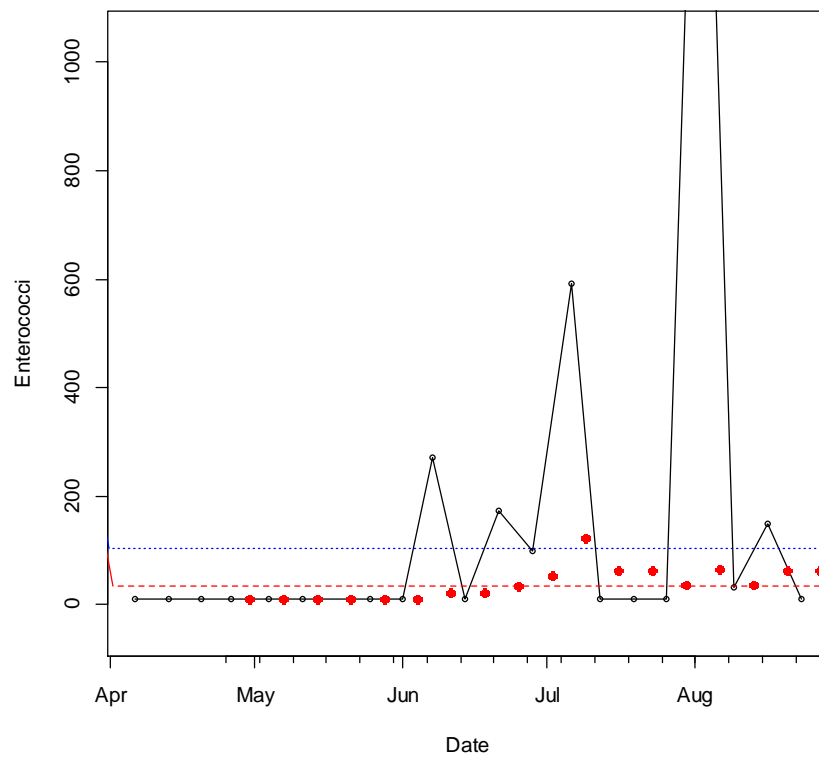
Figure B.4. Time series of sample results collected during 2021 at ELMR1.
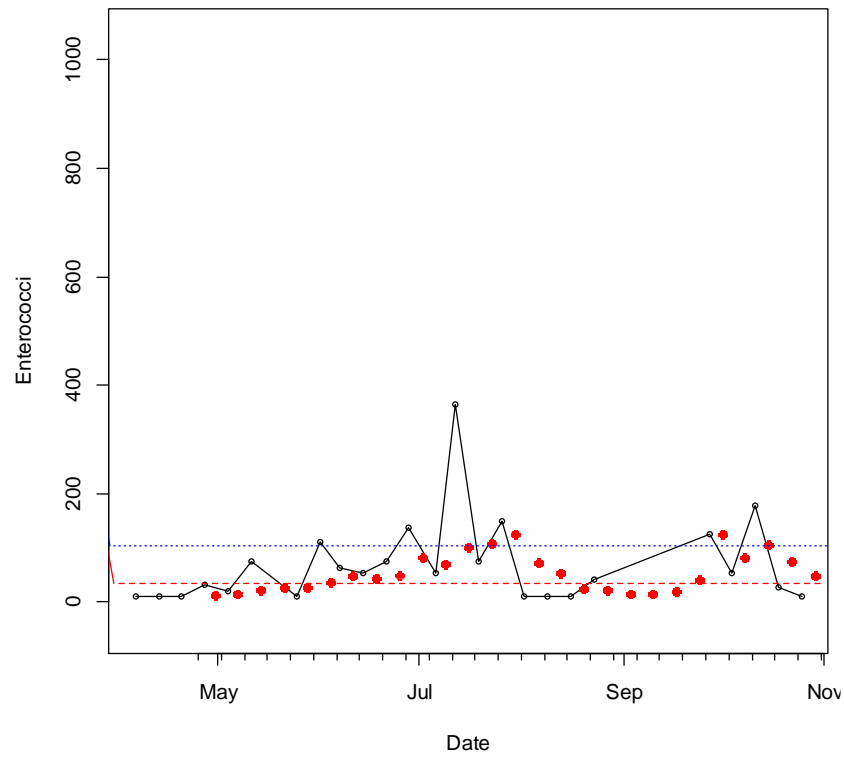
Figure B.5. Time series of sample results collected during 2021 at FNTB1.
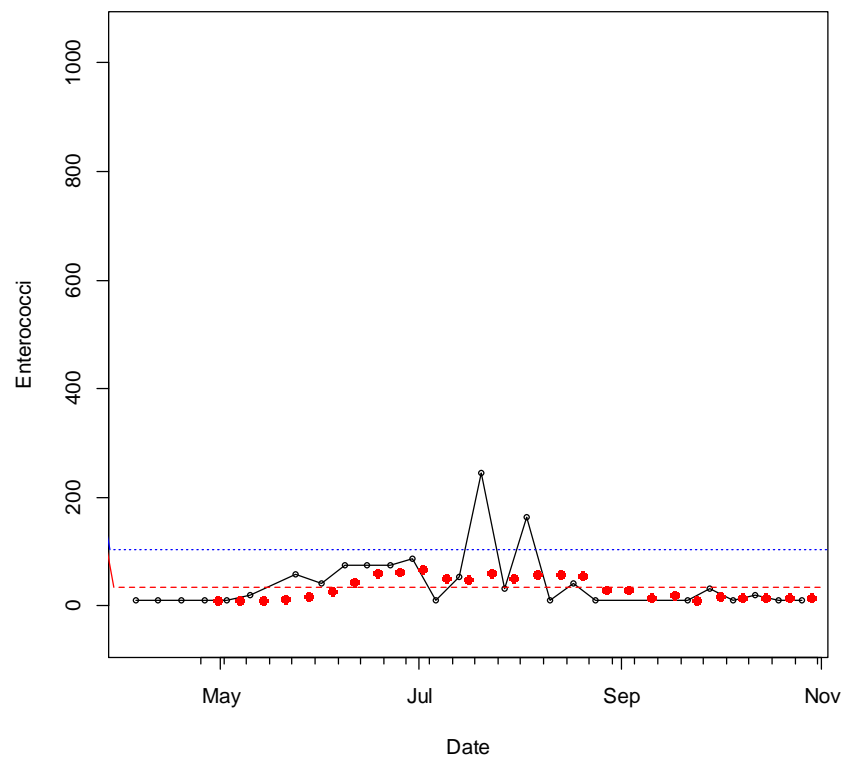
Figure B.6. Time series of sample results collected during 2021 at GBRZ1.
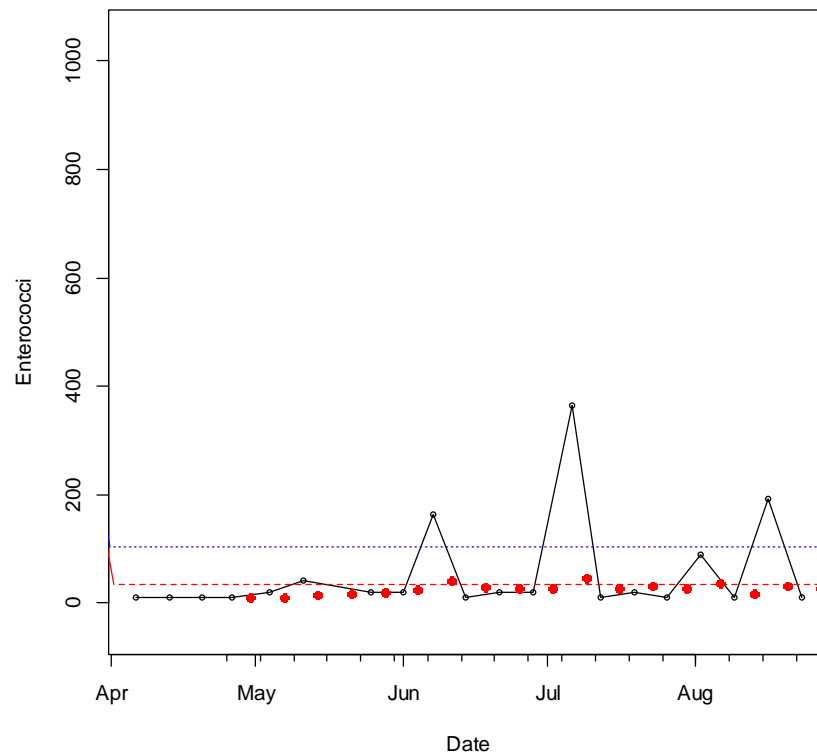
Figure B.7. Time series of sample results collected during 2021 at GIB1.
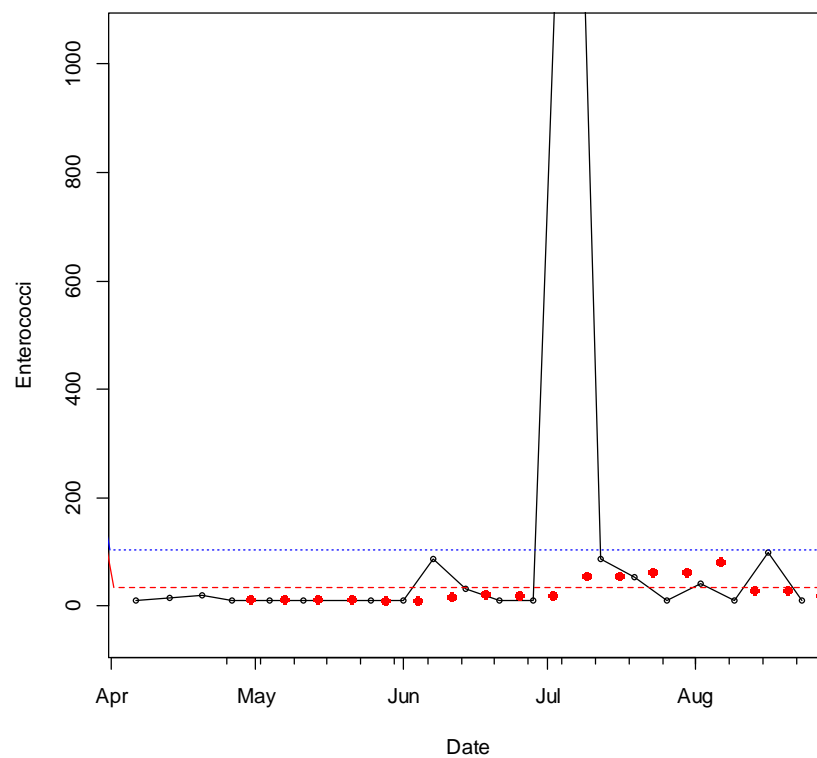
Figure B.8. Time series of sample results collected during 2021 at GIB2.
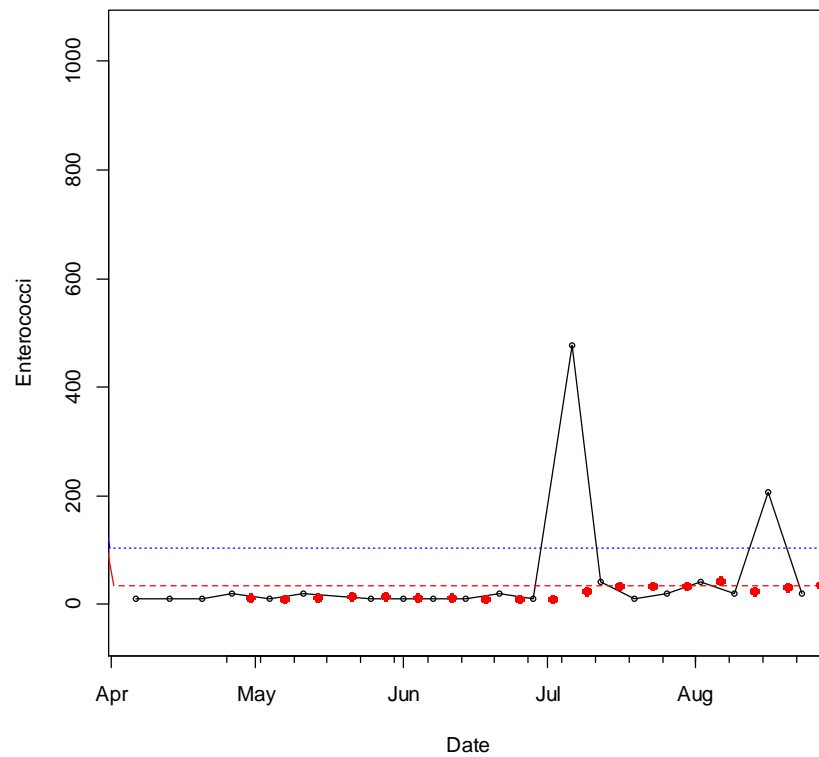
Figure B.9. Time series of sample results collected during 2021 at GIB3.
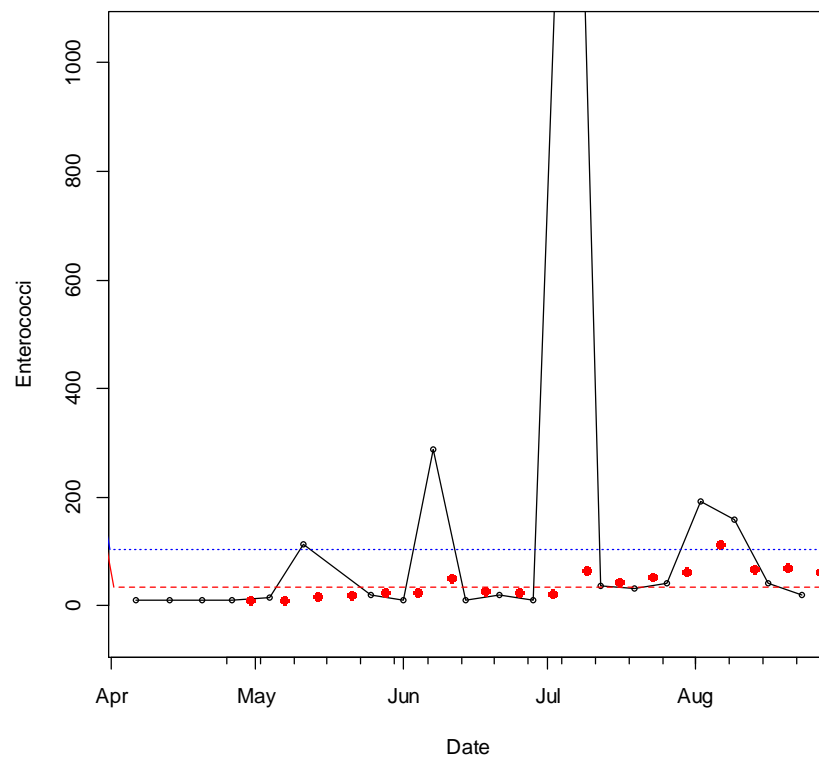
Figure B.10. Time series of sample results collected during 2021 at GISP1.
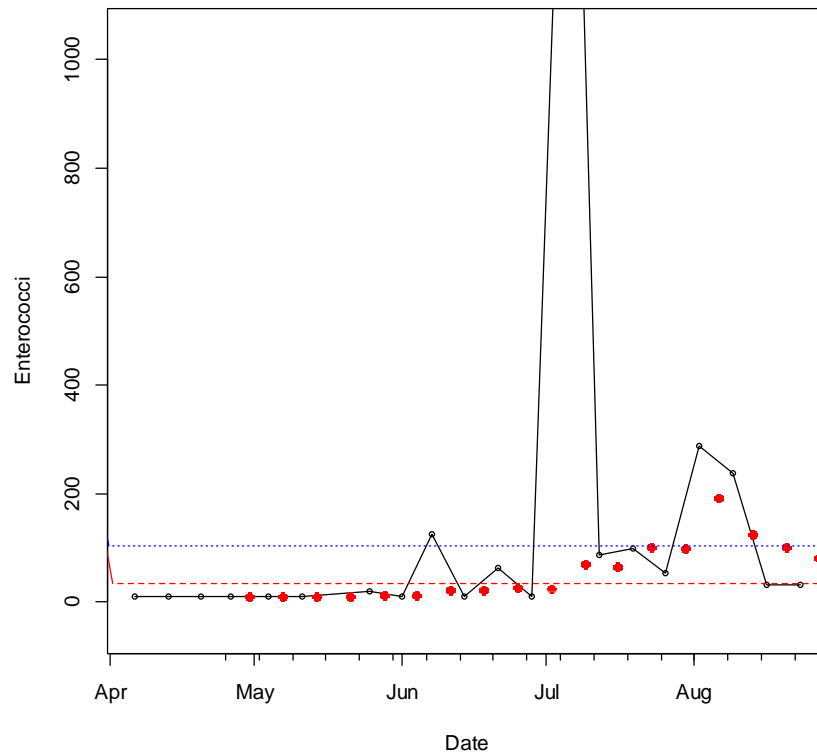
Figure B.11. Time series of sample results collected during 2021 at GISP2.
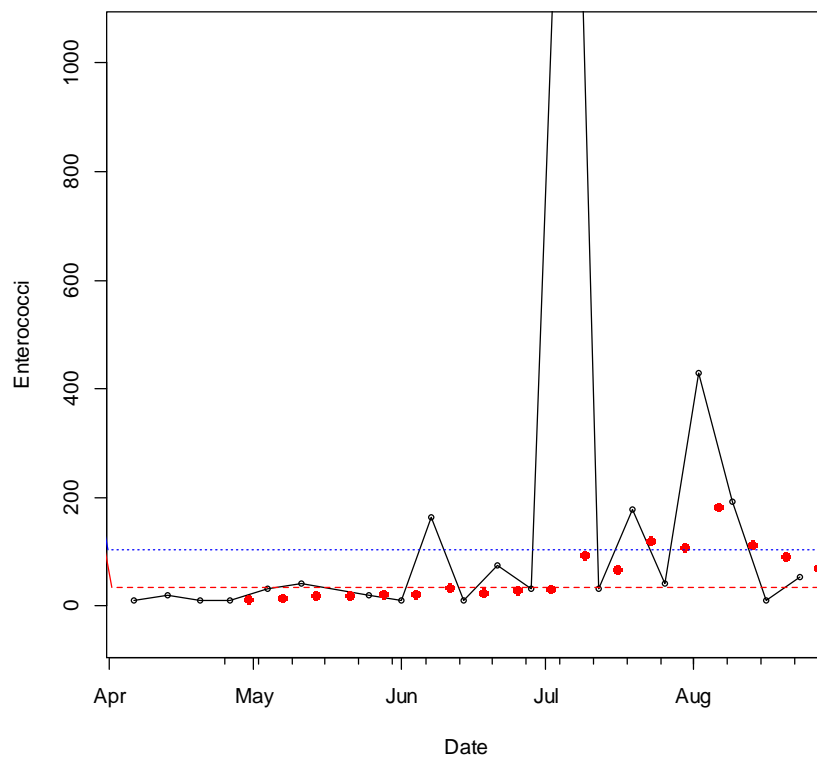
Figure B.12. Time series of sample results collected during 2021 at GISP3.
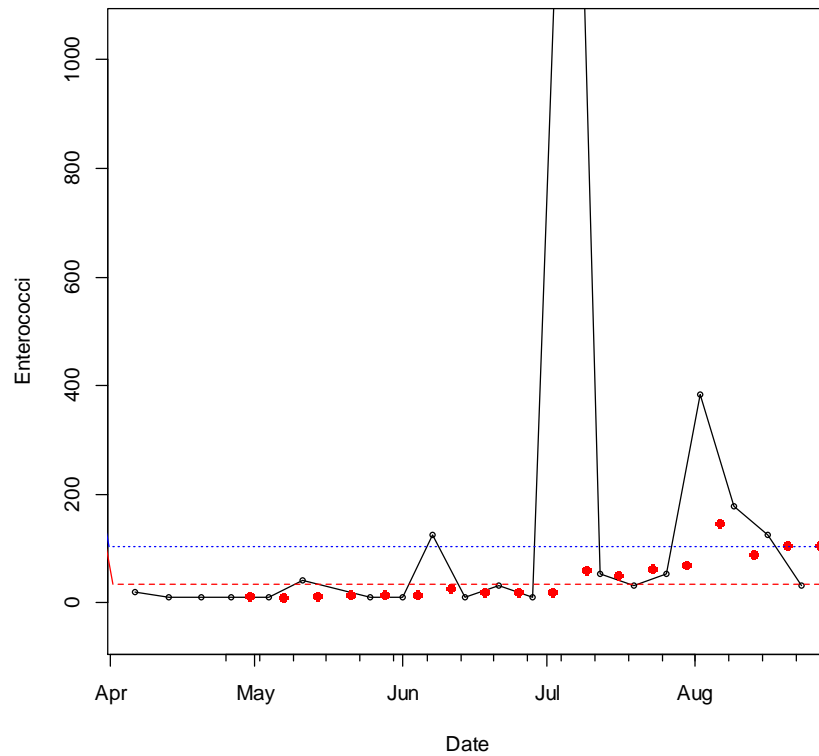
Figure B.13. Time series of sample results collected during 2021 at GISP4.
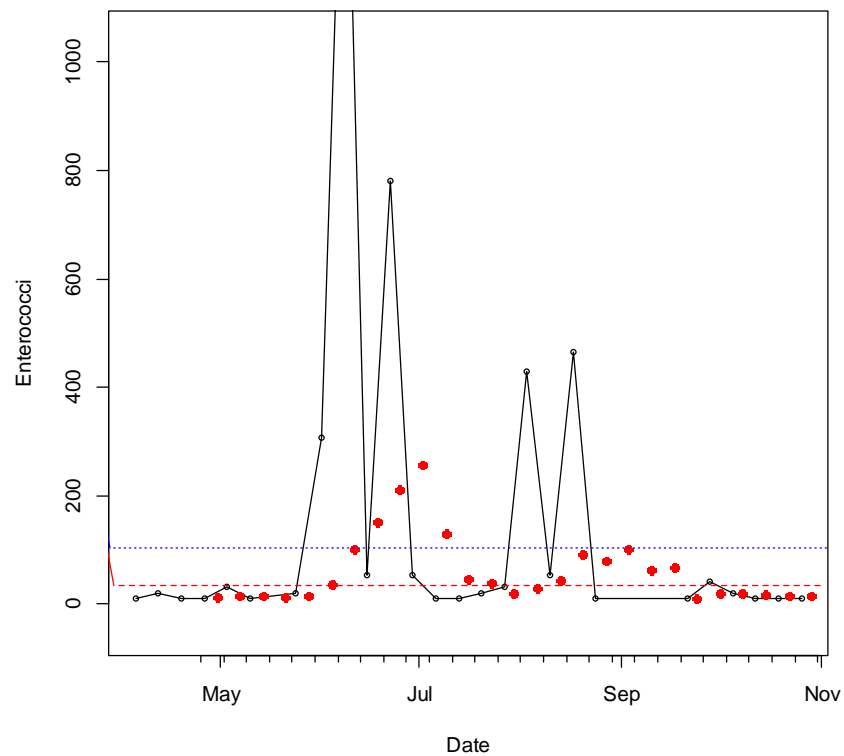
Figure B.14. Time series of sample results collected during 2021 at HOLLY1.
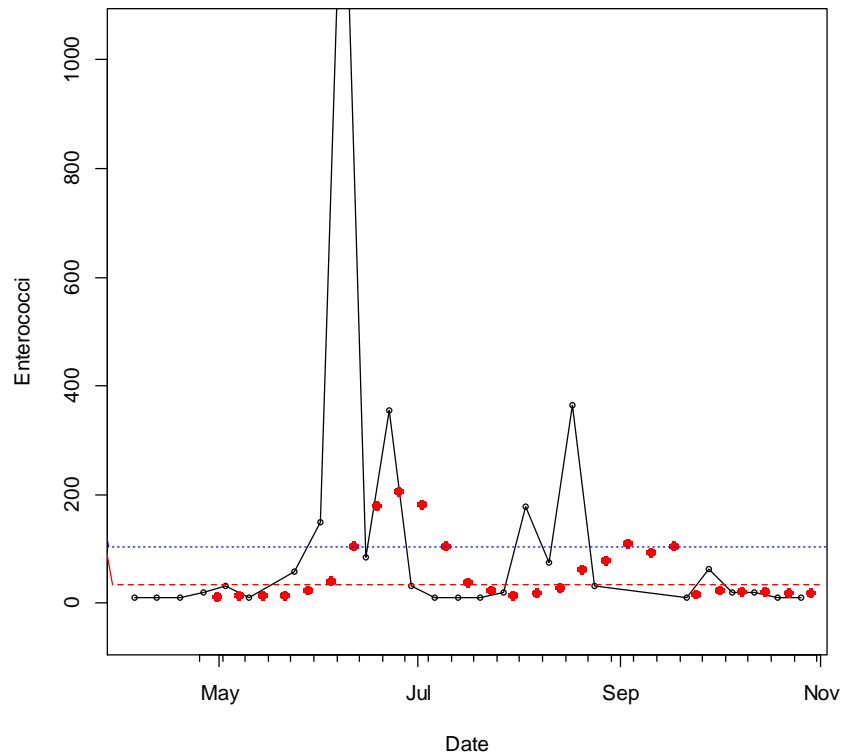
Figure B.15. Time series of sample results collected during 2021 at HOLLY2.
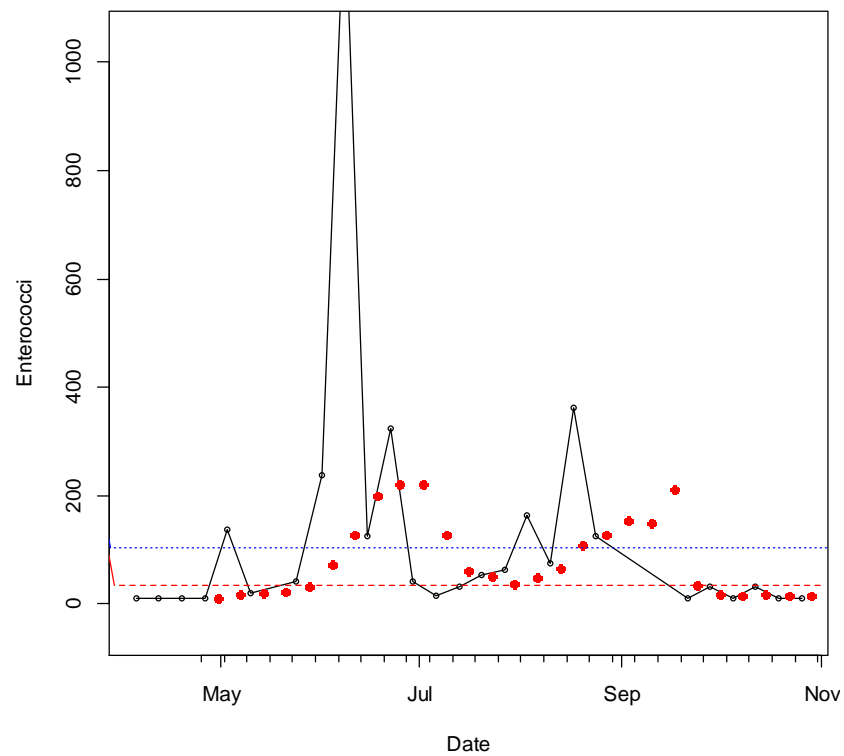
Figure B.16. Time series of sample results collected during 2021 at HOLLY3.
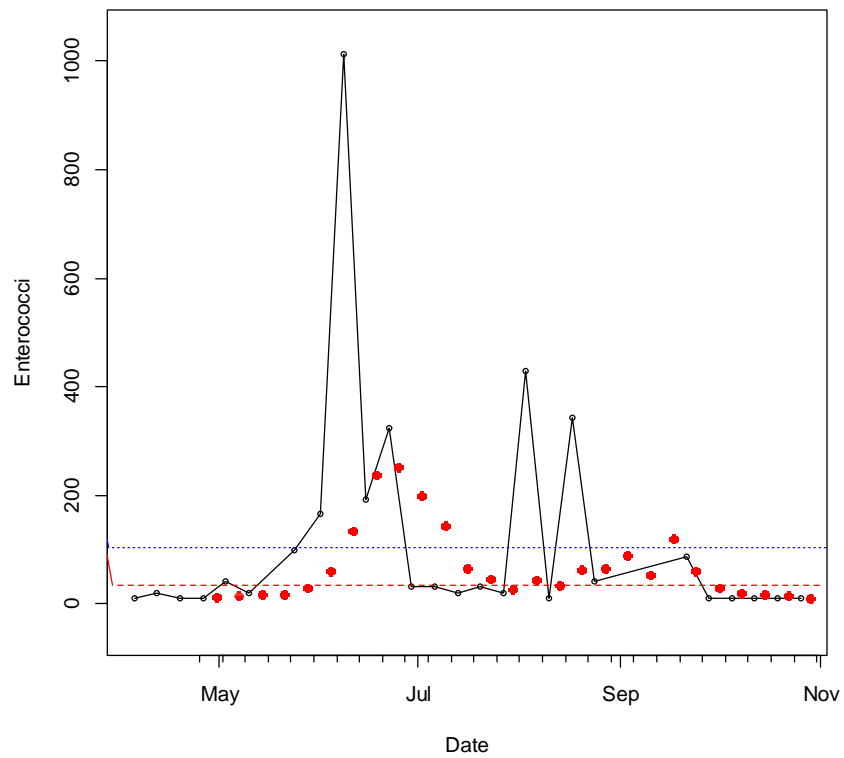
Figure B.17. Time series of sample results collected during 2021 at HOLLY4.
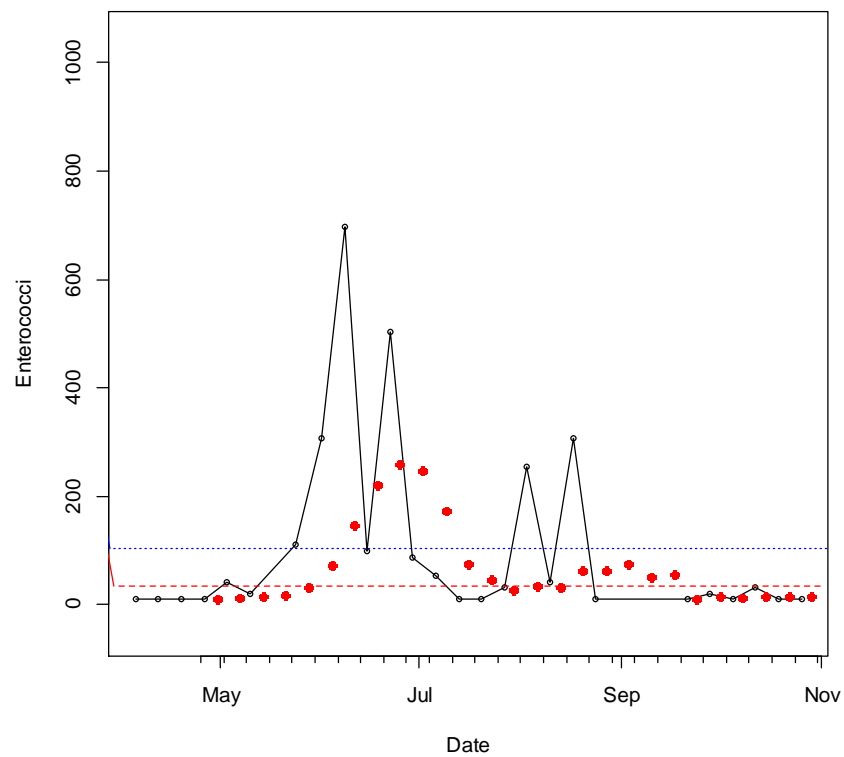
Figure B.18. Time series of sample results collected during 2021 at HOLLY5.
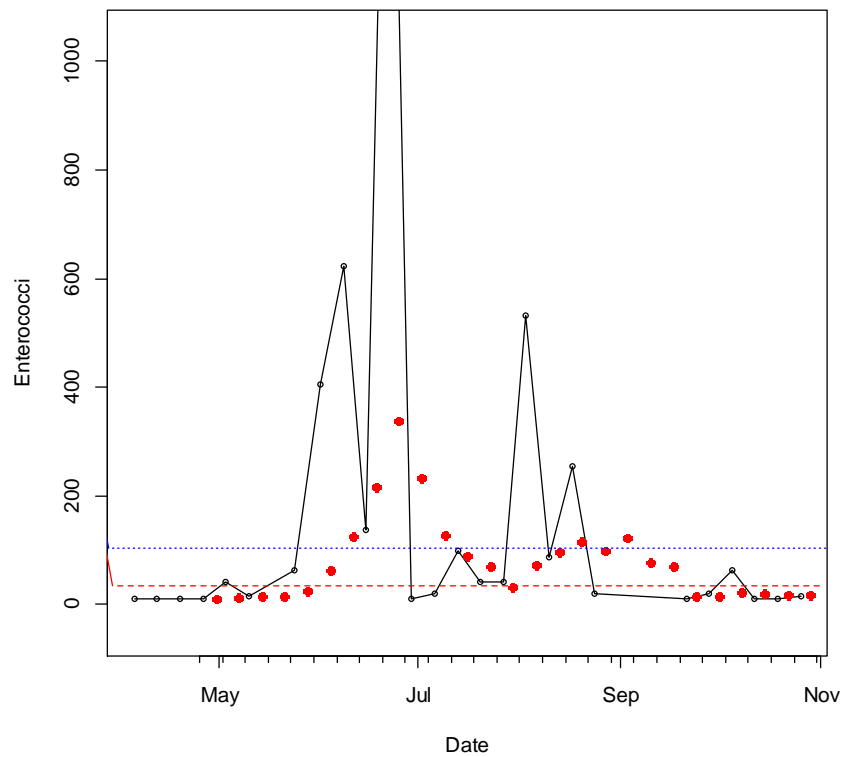
Figure B.19. Time series of sample results collected during 2021 at HOLLY6.
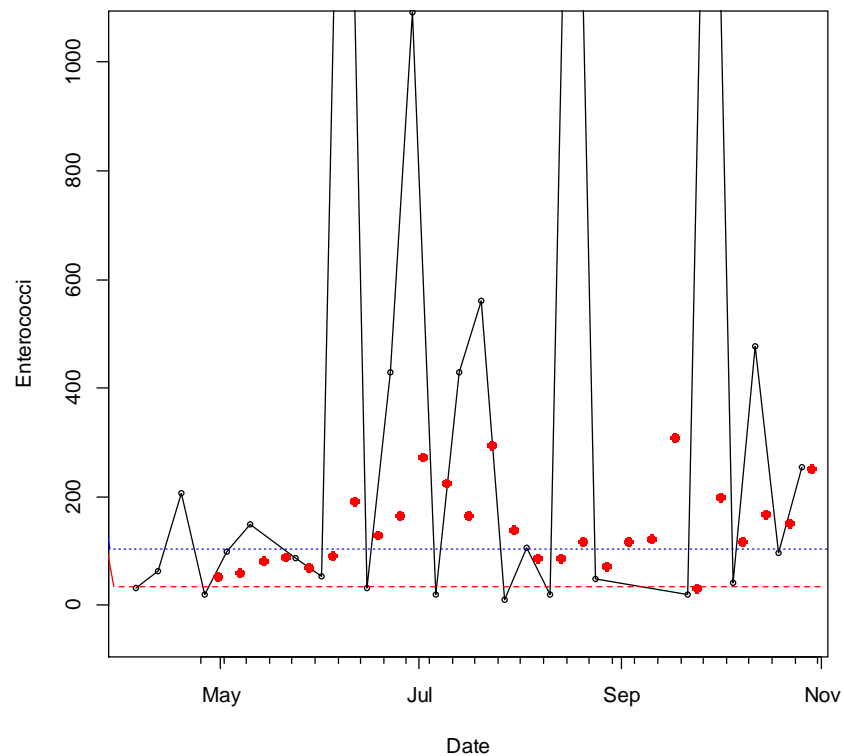
Figure B.20. Time series of sample results collected during 2021 at LCNB1.
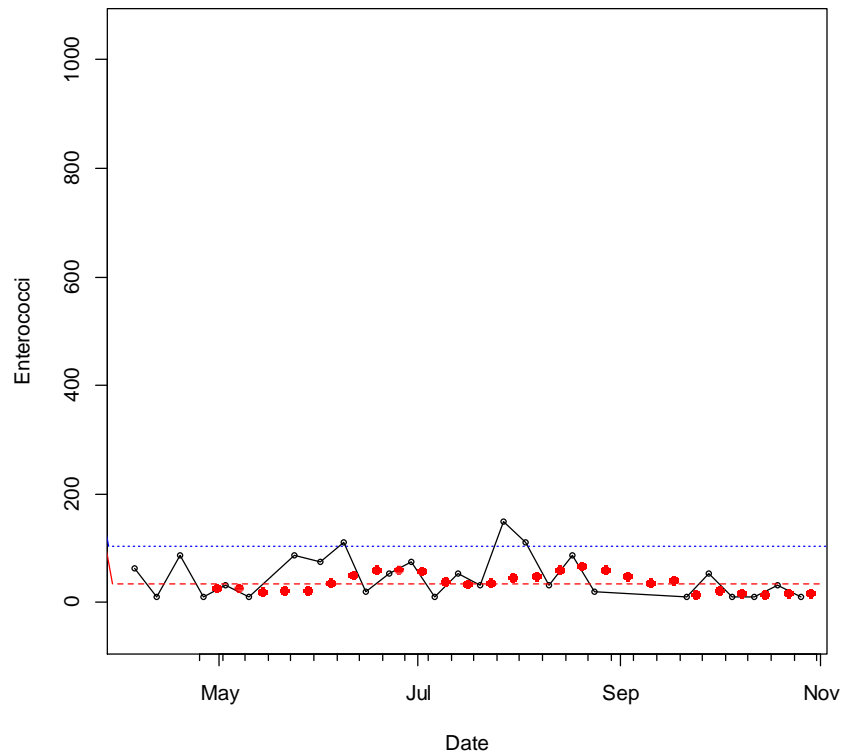
Figure B.21. Time series of sample results collected during 2021 at LTFL1.
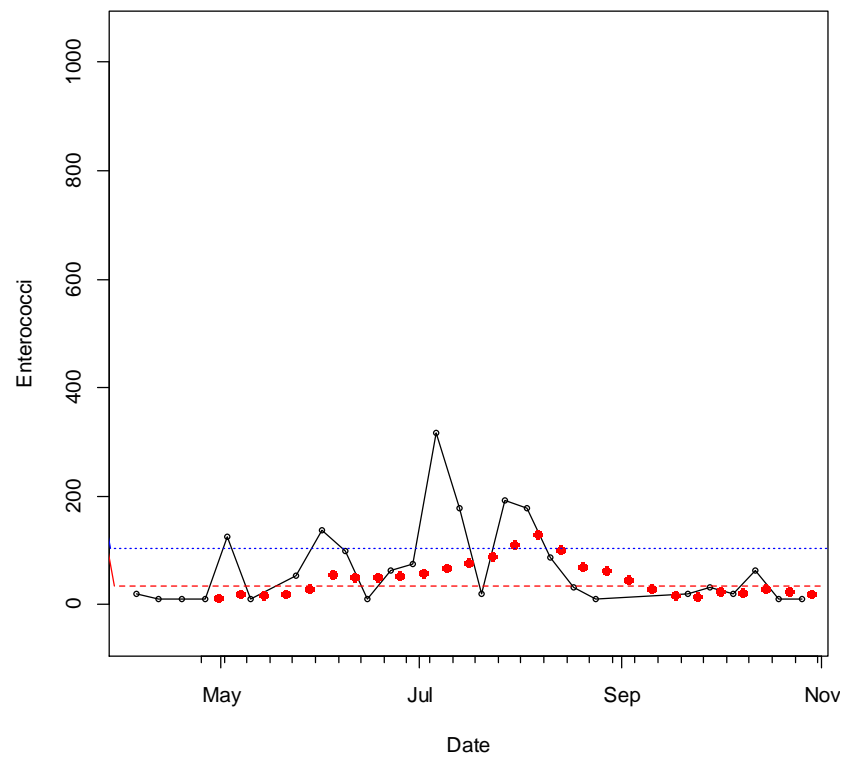
Figure B.22. Time series of sample results collected during 2021 at MART1.
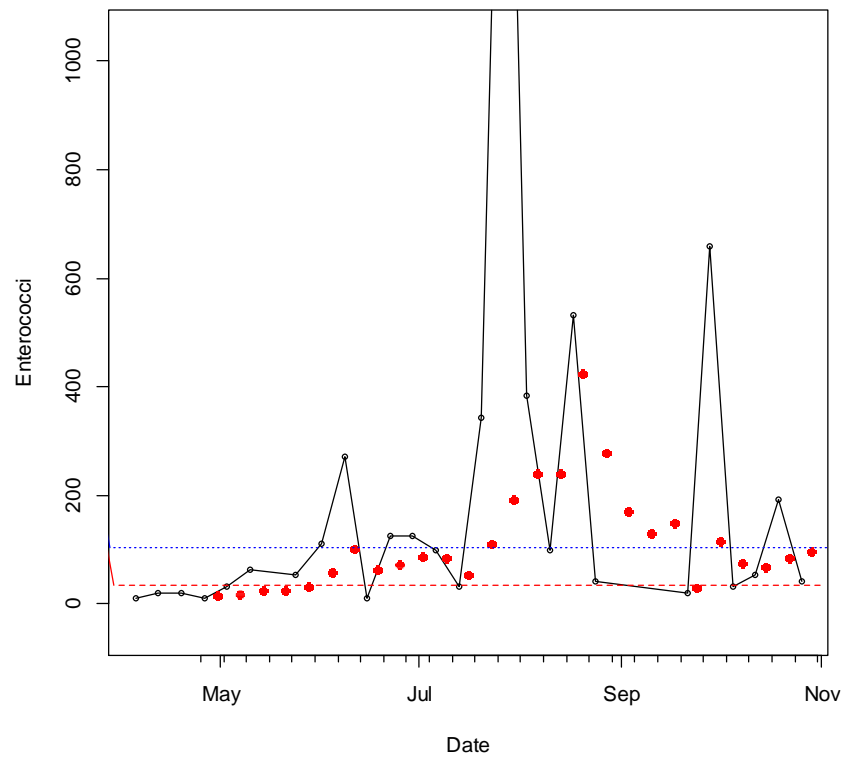
Figure B.23. Time series of sample results collected during 2021 at RUTH1.

APPENDIX C

Sample Results

2021 Beach Sample Results

Beach

Station ID	Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type

Constance Beach

CNST1　　　　　　　*Beach Name*　*Constance Beach*

	Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
	4/5/2021	7:00	Low Tide	Scattered Clouds	Southeast	Light (0-5 mph)	67	10	21.2	Routine
	4/12/2021	7:00	High Tide	Clear	East-Southeast	Light (0-5 mph)	73	10	11.9	Routine
	4/19/2021	7:00	Low Tide Falling	Scattered Clouds	North-Northeast	Light (0-5 mph)	72	42	21.3	Routine
	4/26/2021	7:00	High Tide Falling	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	70	20	22.9	Routine
	5/3/2021	7:00	Low Tide Falling	Cloudy	South	Moderate-Strong (15-20 mph)	73	10	10.6	Routine
	5/10/2021	7:00	High Tide Falling	Cloudy	South-Southeast	Moderate (10-15 mph)	76	99	16.0	Routine
	5/24/2021	7:00	High Tide Falling	Rain	East-Southeast	Moderate (10-15 mph)	76	32	7.7	Routine
	6/1/2021	7:00	Low Tide Falling	Cloudy	South-Southeast	Moderate-Light (5-10 mph)	80	42	12.5	Routine
	6/8/2021	7:00	High Tide Falling	Partly Cloudy	South-Southeast	Moderate (10-15 mph)	81	99	10.2	Routine
	6/15/2021	7:00	Low Tide Falling	Scattered Clouds	South-Southeast	Light (0-5 mph)	85	10	24.4	Routine
	6/22/2021	7:00	High Tide Falling	Cloudy	West	Moderate-Light (5-10 mph)	85	53	18.6	Routine
	6/29/2021	7:00	High Tide	Cloudy	East-Southeast	Moderate (10-15 mph)	86	53	15.0	Routine
	7/6/2021	7:00	High Tide Falling	Cloudy	Southeast	Light (0-5 mph)	85	10	13.9	Routine
	7/13/2021	7:00	High Tide	Clear	South-Southeast	Light (0-5 mph)	85	75	19.0	Routine
	7/20/2021	7:15	Low Tide	Rain	Southwest	Moderate-Light (5-10 mph)	86	10	18.8	Routine
	7/27/2021	7:10	High Tide	Light Rain	South-Southwest	Light (0-5 mph)	86	2005	27.7	Routine
	8/3/2021	7:00	High Tide Falling	Light Rain	West	Light (0-5 mph)	88	87	30.2	Routine
	8/10/2021	7:00	Low Tide Falling	Scattered Clouds	South	Moderate-Light (5-10 mph)	87	20	27.5	Routine
	8/17/2021	7:00	Low Tide Falling	Rain	South-Southeast	Light (0-5 mph)	88	64	19.8	Routine
	8/24/2021	7:00	High Tide Falling	Clear	Northwest	Light (0-5 mph)	89	10	20.5	Routine
	9/21/2021	7:00	High Tide Falling	Scattered Clouds	West-Southwest	Light (0-5 mph)	84	10	23.9	Routine
	9/28/2021	7:10	High Tide Falling	Rain	West-Southwest	Moderate-Light (5-10 mph)	81	10	18.8	Routine
	10/5/2021	7:00	Low Tide	Clear	North	Light (0-5 mph)	82	10	18.6	Routine
	10/12/2021	7:00	Low Tide Falling	Cloudy	South	Moderate (10-15 mph)	82	10	19.0	Routine
	10/19/2021	7:00	High Tide Falling	Partly Cloudy	East-Northeast	Moderate-Light (5-10 mph)	80	10	20.2	Routine
	10/19/2021	7:00	High Tide Falling	Partly Cloudy	East-Northeast	Moderate-Light (5-10 mph)	80	10	20.3	Field Duplicate
	10/26/2021	7:00	High Tide Falling	Partly Cloudy	East	Moderate (10-15 mph)	80	10	20.2	Routine

Beach

| *Station ID* | | | | | Wind | Wind | Water | Entero- | | Sample |
Date	Time	Tide	Weather	Direction	Speed	Temp	cocci	Salinity	Type

Cypremort Point State Park

CYPT1   ***Beach Name***   *Cypremort Point State Park*

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/5/2021	7:15	Low Tide Falling	Cloudy	East-Northeast	Light (0-5 mph)	62	10	1.7	Routine
4/12/2021	7:15	Low Tide	Partly Cloudy	Northwest	Light (0-5 mph)	70	20	1.5	Routine
4/19/2021	7:10	Low Tide Falling	Partly Cloudy	North-Northeast	Light (0-5 mph)	62	53	1.0	Routine
4/19/2021	7:10	Low Tide Falling	Partly Cloudy	North-Northeast	Light (0-5 mph)	62	53	10.0	Field Duplicate
4/26/2021	7:10	High Tide	Clear	South-Southwest	Light (0-5 mph)	70	99	0.4	Field Split
4/26/2021	7:10	High Tide	Clear	South-Southwest	Light (0-5 mph)	70	20	0.6	Routine
5/3/2021	7:00	High Tide Rising	Cloudy	South	Moderate-Strong (15-20 mph)	75	271	0.7	Routine
5/10/2021	7:00	High Tide Rising	Cloudy	South-Southeast	Light (0-5 mph)	76	31	0.5	Routine
5/24/2021	7:00	High Tide Falling	Cloudy	East	Moderate-Light (5-10 mph)	76	20	0.3	Routine
6/1/2021	7:00	Low Tide	Cloudy	East	Light (0-5 mph)	80	10	14.0	Routine
6/8/2021	7:00	Extremely High Tide	Cloudy	East-Southeast	Moderate-Light (5-10 mph)	80	344	0.3	Field Duplicate
6/8/2021	7:00	Extremely High Tide	Cloudy	East-Southeast	Moderate-Light (5-10 mph)	80	478	0.3	Routine
6/15/2021	7:00	Low Tide Falling	Cloudy	Southeast	Light (0-5 mph)	90	87	0.4	Routine
6/22/2021	6:50	High Tide	Cloudy	Northeast	Light (0-5 mph)	82	306	0.4	Routine
6/29/2021	6:50	High Tide Falling	Partly Cloudy	East-Northeast	Moderate-Light (5-10 mph)	80	207	0.4	Routine
7/6/2021	6:50	High Tide	Partly Cloudy	East-Northeast	Light (0-5 mph)	84	10	0.4	Routine
7/13/2021	6:50	High Tide Falling	Scattered Clouds	North-Northwest	Light (0-5 mph)	84	64	0.4	Routine
7/20/2021	6:50	High Tide Rising	Light Rain	West	Light (0-5 mph)	84	271	0.3	Routine
7/27/2021	6:50	High Tide Falling	Scattered Clouds	Calm	Calm (0 mph)	85	20	0.3	Routine
8/3/2021	6:50	High Tide Rising	Light Rain	West	Light (0-5 mph)	85	20	0.5	Routine
8/10/2021	6:50	High Tide Falling	Scattered Clouds	South-Southeast	Moderate-Light (5-10 mph)	85	10	2.1	Routine
8/17/2021	6:50	High Tide	Cloudy	East-Southeast	Calm (0 mph)	84	64	4.0	Routine
8/24/2021	6:50	Low Tide Falling	Cloudy	East-Southeast	Light (0-5 mph)	88	10	3.2	Routine
8/24/2021	6:50	Low Tide Falling	Cloudy	East-Southeast	Light (0-5 mph)	88	31	3.2	Field Split
9/21/2021	6:50	High Tide Falling	Cloudy	Calm	Calm (0 mph)	82	137	6.5	Routine
9/28/2021	6:50	High Tide Falling	Light Rain	South-Southeast	Light (0-5 mph)	75	64	5.7	Routine
10/5/2021	7:00	High Tide Falling	Cloudy	North	Light (0-5 mph)	80	20	5.0	Routine
10/12/2021	6:50	Extremely High Tide	Scattered Clouds	Southeast	Light (0-5 mph)	80	624	3.4	Routine
10/19/2021	6:45	High Tide	Partly Cloudy	East-Northeast	Moderate-Light (5-10 mph)	70	10	3.3	Routine
10/26/2021	6:45	High Tide Falling	Clear	East	Light (0-5 mph)	69	164	3.3	Routine

Beach									
Station ID					Wind	Wind	Water	Entero-		Sample
Date	Time	Tide	Weather	Direction	Speed	Temp	cocci	Salinity	Type

Elmer's Island

ELMR1   ***Beach Name*** *Elmer's Island - 1*

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/6/2021	6:01	High Tide	Clear	East	Moderate-Light (5-10 mph)	71	10	21.3	Routine
4/13/2021	6:20	Low Tide Falling	Cloudy	East-Southeast	Moderate (10-15 mph)	71	10	14.2	Routine
4/20/2021	6:03	High Tide Rising	Cloudy	East-Northeast	Moderate-Light (5-10 mph)	73	10	18.3	Routine
4/26/2021	6:30	High Tide	Clear	East	Moderate-Light (5-10 mph)	73	10	18.9	Routine
5/4/2021	6:30	Low Tide Falling	Scattered Clouds	South-Southeast	Moderate-Light (5-10 mph)	75	10	20.2	Routine
5/11/2021	6:05	High Tide	Cloudy	South	Moderate (10-15 mph)	78	10	18.5	Routine
5/25/2021	6:20	High Tide	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	78	10	13.2	Field Split
5/25/2021	6:20	High Tide	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	78	10	13.2	Routine
6/1/2021	6:16	Low Tide	Scattered Clouds	East-Southeast	Moderate (10-15 mph)	80	10	14.6	Routine
6/7/2021	6:09	High Tide Falling	Partly Cloudy	Southeast	Moderate (10-15 mph)	82	271	10.5	Routine
6/14/2021	6:13	Low Tide Falling	Partly Cloudy	South-Southwest	Light (0-5 mph)	84	10	18.7	Routine
6/21/2021	6:04	High Tide Falling	Light Rain	South	Moderate (10-15 mph)	83	207	14.3	Routine
6/21/2021	6:04	High Tide Falling	Light Rain	South	Moderate (10-15 mph)	83	137	10.8	Field Split
6/28/2021	5:54	Low Tide Falling	Cloudy	East	Moderate (10-15 mph)	84	99	14.1	Routine
7/6/2021	5:54	High Tide	Rain	South	Calm (0 mph)	82	591	19.7	Routine
7/12/2021	5:46	Low Tide Falling	Cloudy	South-Southwest	Moderate (10-15 mph)	83	10	16.2	Routine
7/19/2021	5:53	High Tide Falling	Partly Cloudy	Southwest	Moderate-Light (5-10 mph)	83	10	16.0	Routine
7/26/2021	5:53	Low Tide Falling	Partly Cloudy	South-Southeast	Light (0-5 mph)	86	10	26.2	Field Split
7/26/2021	5:53	Low Tide Falling	Partly Cloudy	South-Southeast	Light (0-5 mph)	86	10	26.1	Routine
8/2/2021	5:57	High Tide Falling	Light Rain	West	Moderate-Light (5-10 mph)	88	2005	23.0	Routine
8/9/2021	5:54	Low Tide Falling	Cloudy	South-Southwest	Light (0-5 mph)	88	31	21.2	Routine
8/16/2021	5:56	High Tide Falling	Rain	North-Northeast	Moderate (10-15 mph)	87	150	16.4	Routine
8/23/2021	5:47	Low Tide Falling	Cloudy	Northwest	Moderate-Light (5-10 mph)	88	10	16.5	Routine

Fontainebleau State Park

FNTB1   ***Beach Name*** *Fontainebleau State Park*

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/6/2021	9:45	High Tide Falling	Cloudy	South-Southeast	Light (0-5 mph)	68	10	2.3	Routine
4/13/2021	9:20	Low Tide Falling	Cloudy	Southeast	Moderate-Light (5-10 mph)	70	10	2.2	Routine
4/20/2021	9:10	High Tide Falling	Partly Cloudy	North-Northeast	Light (0-5 mph)	69	10	0.9	Routine
4/27/2021	9:15	Low Tide Falling	Cloudy	East-Southeast	Moderate-Light (5-10 mph)	69	31	0.7	Routine
5/4/2021	8:40	High Tide Falling	Cloudy	South	Moderate (10-15 mph)	76	20	1.8	Routine

Beach

Station ID

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
5/11/2021	8:05	Low Tide Falling	Light Rain	South-Southeast	Light (0-5 mph)	77	75	1.3	Routine
5/25/2021	8:42	Low Tide Falling	Scattered Clouds	East-Southeast	Light (0-5 mph)	76	10		Routine
6/1/2021	7:45	High Tide Falling	Cloudy	East-Southeast	Light (0-5 mph)	81	111	1.2	Routine
6/7/2021	8:30	Low Tide Falling	Partly Cloudy	South-Southeast	Moderate-Light (5-10 mph)	81	64	1.0	Routine
6/14/2021	8:30	Low Tide	Partly Cloudy	North-Northwest	Light (0-5 mph)	82	53	0.5	Routine
6/21/2021	8:30	Low Tide Falling	Cloudy	South-Southwest	Moderate-Light (5-10 mph)	84	75	0.4	Routine
6/28/2021	8:17	Low Tide	Mist	East-Northeast	Moderate-Light (5-10 mph)	84	137	0.6	Routine
7/6/2021	7:40	Low Tide Falling	Cloudy	East-Southeast	Light (0-5 mph)	84	53	0.5	Routine
7/12/2021	8:40	Low Tide	Cloudy	Southwest	Light (0-5 mph)	83	364	0.5	Routine
7/19/2021	8:20	Low Tide Falling	Partly Cloudy	West-Southwest	Light (0-5 mph)	83	75	0.6	Routine
7/26/2021	8:15	Low Tide	Partly Cloudy	South	Light (0-5 mph)	86	150	0.4	Routine
8/2/2021	8:15	Low Tide Falling	Scattered Clouds	West-Northwest	Light (0-5 mph)	89	10	0.4	Routine
8/9/2021	7:35	Low Tide	Partly Cloudy	Southwest	Light (0-5 mph)	86	10	0.5	Routine
8/16/2021	7:45	Low Tide Falling	Clear	North	Light (0-5 mph)	87	10	0.5	Routine
8/16/2021	7:45	Low Tide Falling	Clear	North	Light (0-5 mph)	87	10	0.4	Field Split
8/23/2021	8:01	Low Tide	Partly Cloudy	Northwest	Moderate-Light (5-10 mph)	89	42	0.4	Routine
9/27/2021	10:00	Low Tide Falling	Partly Cloudy	East-Northeast	Light (0-5 mph)	79	124	1.2	Routine
10/4/2021	8:30	Low Tide	Clear	East-Southeast	Light (0-5 mph)	77	53	1.6	Routine
10/11/2021	9:05	Low Tide Falling	Scattered Clouds	Northwest	Light (0-5 mph)	81	178	1.7	Routine
10/18/2021	8:30	High Tide Falling	Cloudy	Northeast	Moderate-Light (5-10 mph)	81	42	2.0	Routine
10/18/2021	8:30	High Tide Falling	Cloudy	Northeast	Moderate-Light (5-10 mph)	81	10	2.0	Field Split
10/25/2021	8:30	High Tide	Cloudy	West-Northwest	Light (0-5 mph)	75	10	1.9	Routine
10/25/2021	8:30	High Tide	Cloudy	West-Northwest	Light (0-5 mph)	75	10	2.0	Field Split

Grand Isle Beach

GIB1   **Beach Name** *Grand Isle Beach - 1*

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/6/2021	6:01	High Tide	Clear	East	Moderate-Light (5-10 mph)	71	10	19.8	Routine
4/13/2021	6:20	Low Tide Falling	Cloudy	East-Southeast	Moderate (10-15 mph)	71	10	13.7	Routine
4/20/2021	6:03	High Tide Rising	Cloudy	East-Northeast	Moderate-Light (5-10 mph)	72	10	18.6	Routine
4/26/2021	6:30	High Tide	Clear	East	Moderate-Light (5-10 mph)	72	10	18.8	Routine
5/4/2021	6:30	Low Tide Falling	Scattered Clouds	South-Southeast	Moderate-Light (5-10 mph)	77	20	10.4	Routine
5/11/2021	6:05	High Tide	Cloudy	South	Moderate (10-15 mph)	78	42	13.3	Routine
5/25/2021	6:20	High Tide	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	78	31	11.1	Routine
5/25/2021	6:20	High Tide	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	78	10	11.1	Field Duplicate

Beach

Station ID

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
6/1/2021	6:16	Low Tide	Scattered Clouds	East-Southeast	Moderate (10-15 mph)	79	20	17.3	Routine
6/7/2021	6:09	High Tide Falling	Partly Cloudy	Southeast	Moderate (10-15 mph)	82	164	14.4	Routine
6/14/2021	6:13	Low Tide Falling	Partly Cloudy	South-Southwest	Light (0-5 mph)	84	10	19.7	Routine
6/21/2021	6:04	High Tide Falling	Light Rain	South	Moderate (10-15 mph)	83	20	29.2	Routine
6/28/2021	5:54	Low Tide Falling	Cloudy	East	Moderate (10-15 mph)	84	20	11.5	Routine
7/6/2021	5:54	High Tide	Rain	South	Calm (0 mph)	82	364	20.2	Routine
7/12/2021	5:46	Low Tide Falling	Cloudy	South-Southwest	Moderate (10-15 mph)	83	10	18.8	Routine
7/19/2021	5:53	High Tide Falling	Partly Cloudy	Southwest	Moderate-Light (5-10 mph)	83	20	16.4	Routine
7/26/2021	5:53	Low Tide Falling	Partly Cloudy	South-Southeast	Light (0-5 mph)	86	10	25.7	Routine
8/2/2021	5:57	High Tide Falling	Light Rain	West	Moderate-Light (5-10 mph)	88	53	24.1	Routine
8/2/2021	5:57	High Tide Falling	Light Rain	West	Moderate-Light (5-10 mph)	88	124	24.1	Field Split
8/9/2021	5:54	Low Tide Falling	Cloudy	South-Southwest	Light (0-5 mph)	88	10	22.9	Routine
8/16/2021	5:56	High Tide Falling	Rain	North-Northeast	Moderate (10-15 mph)	87	192	14.6	Routine
8/23/2021	5:47	Low Tide Falling	Cloudy	Northwest	Moderate-Light (5-10 mph)	88	10	19.6	Routine

Grand Isle Beach

GIB2　　　　　　　　*Beach Name Grand Isle Beach - 2*

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/6/2021	6:01	High Tide	Clear	East	Moderate-Light (5-10 mph)	71	10	19.8	Routine
4/13/2021	6:20	Low Tide Falling	Cloudy	East-Southeast	Moderate (10-15 mph)	71	20	13.8	Field Split
4/13/2021	6:20	Low Tide Falling	Cloudy	East-Southeast	Moderate (10-15 mph)	71	10	13.6	Routine
4/20/2021	6:03	High Tide Rising	Cloudy	East-Northeast	Moderate-Light (5-10 mph)	72	20	18.6	Routine
4/26/2021	6:30	High Tide	Clear	East	Moderate-Light (5-10 mph)	72	10	18.2	Routine
5/4/2021	6:30	Low Tide Falling	Scattered Clouds	South-Southeast	Moderate-Light (5-10 mph)	77	10	20.9	Routine
5/11/2021	6:05	High Tide	Cloudy	South	Moderate (10-15 mph)	78	10	12.8	Routine
5/25/2021	6:20	High Tide	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	78	10	11.9	Routine
6/1/2021	6:16	Low Tide	Scattered Clouds	East-Southeast	Moderate (10-15 mph)	79	10	14.8	Routine
6/7/2021	6:09	High Tide Falling	Partly Cloudy	Southeast	Moderate (10-15 mph)	82	87	15.2	Routine
6/14/2021	6:13	Low Tide Falling	Partly Cloudy	South-Southwest	Light (0-5 mph)	84	31	19.8	Routine
6/21/2021	6:04	High Tide Falling	Light Rain	South	Moderate (10-15 mph)	83	10	29.7	Routine
6/28/2021	5:54	Low Tide Falling	Cloudy	East	Moderate (10-15 mph)	84	10	11.0	Routine
7/6/2021	5:54	High Tide	Rain	South	Calm (0 mph)	82	2005	19.1	Routine
7/12/2021	5:46	Low Tide Falling	Cloudy	South-Southwest	Moderate (10-15 mph)	83	87	18.3	Routine
7/19/2021	5:53	High Tide Falling	Partly Cloudy	Southwest	Moderate-Light (5-10 mph)	83	53	15.3	Routine
7/26/2021	5:53	Low Tide Falling	Partly Cloudy	South-Southeast	Light (0-5 mph)	86	10	24.6	Routine

Beach

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
8/2/2021	5:57	High Tide Falling	Light Rain	West	Moderate-Light (5-10 mph)	88	31	24.0	Field Split
8/2/2021	5:57	High Tide Falling	Light Rain	West	Moderate-Light (5-10 mph)	88	53	23.8	Routine
8/9/2021	5:54	Low Tide Falling	Cloudy	South-Southwest	Light (0-5 mph)	88	10	22.7	Routine
8/16/2021	5:56	High Tide Falling	Rain	North-Northeast	Moderate (10-15 mph)	87	99	14.3	Routine
8/23/2021	5:47	Low Tide Falling	Cloudy	Northwest	Moderate-Light (5-10 mph)	88	10	18.7	Routine

Grand Isle Beach

GIB3   **Beach Name** *Grand Isle Beach - 3*

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/6/2021	6:01	High Tide	Clear	East	Moderate-Light (5-10 mph)	71	10	19.8	Field Duplicate
4/6/2021	6:01	High Tide	Clear	East	Moderate-Light (5-10 mph)	71	10	19.8	Routine
4/13/2021	6:20	Low Tide Falling	Cloudy	East-Southeast	Moderate (10-15 mph)	71	10	13.7	Routine
4/20/2021	6:03	High Tide Rising	Cloudy	East-Northeast	Moderate-Light (5-10 mph)	72	10	18.1	Routine
4/26/2021	6:30	High Tide	Clear	East	Moderate-Light (5-10 mph)	72	20	18.4	Routine
5/4/2021	6:30	Low Tide Falling	Scattered Clouds	South-Southeast	Moderate-Light (5-10 mph)	77	10	21.0	Routine
5/11/2021	6:05	High Tide	Cloudy	South	Moderate (10-15 mph)	78	20	14.0	Routine
5/25/2021	6:20	High Tide	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	78	10	12.3	Routine
6/1/2021	6:16	Low Tide	Scattered Clouds	East-Southeast	Moderate (10-15 mph)	79	10	14.9	Routine
6/7/2021	6:09	High Tide Falling	Partly Cloudy	Southeast	Moderate (10-15 mph)	82	10	15.1	Routine
6/14/2021	6:13	Low Tide Falling	Partly Cloudy	South-Southwest	Light (0-5 mph)	84	10	21.0	Routine
6/21/2021	6:04	High Tide Falling	Light Rain	South	Moderate (10-15 mph)	83	20	30.1	Routine
6/28/2021	5:54	Low Tide Falling	Cloudy	East	Moderate (10-15 mph)	84	10	12.6	Field Duplicate
6/28/2021	5:54	Low Tide Falling	Cloudy	East	Moderate (10-15 mph)	84	10	12.5	Routine
7/6/2021	5:54	High Tide	Rain	South	Calm (0 mph)	82	478	14.7	Routine
7/12/2021	5:46	Low Tide Falling	Cloudy	South-Southwest	Moderate (10-15 mph)	83	42	16.3	Routine
7/19/2021	5:53	High Tide Falling	Partly Cloudy	Southwest	Moderate-Light (5-10 mph)	83	10	16.5	Routine
7/26/2021	5:53	Low Tide Falling	Partly Cloudy	South-Southeast	Light (0-5 mph)	86	20	24.2	Routine
8/2/2021	5:57	High Tide Falling	Light Rain	West	Moderate-Light (5-10 mph)	88	42	24.2	Routine
8/9/2021	5:54	Low Tide Falling	Cloudy	South-Southwest	Light (0-5 mph)	88	31	21.9	Field Split
8/9/2021	5:54	Low Tide Falling	Cloudy	South-Southwest	Light (0-5 mph)	88	10	21.8	Routine
8/16/2021	5:56	High Tide Falling	Rain	North-Northeast	Moderate (10-15 mph)	87	207	14.2	Routine
8/23/2021	5:47	Low Tide Falling	Cloudy	Northwest	Moderate-Light (5-10 mph)	88	20	20.2	Routine

Grand Isle State Park

GISP1   **Beach Name** *Grand Isle State Park - 1*

Beach

Station ID

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/6/2021	6:01	High Tide	Clear	East	Moderate-Light (5-10 mph)	71	10	19.8	Routine
4/13/2021	6:20	Low Tide Falling	Cloudy	East-Southeast	Moderate (10-15 mph)	71	10	13.7	Routine
4/20/2021	6:03	High Tide Rising	Cloudy	East-Northeast	Moderate-Light (5-10 mph)	72	10	17.1	Routine
4/26/2021	6:30	High Tide	Clear	East	Moderate-Light (5-10 mph)	72	10	18.3	Routine
5/4/2021	6:30	Low Tide Falling	Scattered Clouds	South-Southeast	Moderate-Light (5-10 mph)	77	10	19.7	Field Split
5/4/2021	6:30	Low Tide Falling	Scattered Clouds	South-Southeast	Moderate-Light (5-10 mph)	77	20	19.8	Routine
5/11/2021	6:05	High Tide	Cloudy	South	Moderate (10-15 mph)	78	64	11.5	Routine
5/11/2021	6:05	High Tide	Cloudy	South	Moderate (10-15 mph)	78	164	11.5	Field Duplicate
5/25/2021	6:20	High Tide	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	78	20	12.5	Routine
6/1/2021	6:16	Low Tide	Scattered Clouds	East-Southeast	Moderate (10-15 mph)	78	10	14.4	Routine
6/7/2021	6:09	High Tide Falling	Partly Cloudy	Southeast	Moderate (10-15 mph)	82	288	14.1	Routine
6/14/2021	6:13	Low Tide Falling	Partly Cloudy	South-Southwest	Light (0-5 mph)	84	10	16.1	Routine
6/21/2021	6:04	High Tide Falling	Light Rain	South	Moderate (10-15 mph)	83	20	28.1	Routine
6/28/2021	5:54	Low Tide Falling	Cloudy	East	Moderate (10-15 mph)	84	10	11.4	Routine
7/6/2021	5:54	High Tide	Rain	South	Calm (0 mph)	82	2005	12.3	Routine
7/12/2021	5:46	Low Tide Falling	Cloudy	South-Southwest	Moderate (10-15 mph)	83	20	14.7	Routine
7/12/2021	5:46	Low Tide Falling	Cloudy	South-Southwest	Moderate (10-15 mph)	83	53	14.8	Field Duplicate
7/19/2021	5:53	High Tide Falling	Partly Cloudy	Southwest	Moderate-Light (5-10 mph)	83	31	17.2	Routine
7/26/2021	5:53	Low Tide Falling	Partly Cloudy	South-Southeast	Light (0-5 mph)	86	42	22.5	Routine
8/2/2021	5:57	High Tide Falling	Light Rain	West	Moderate-Light (5-10 mph)	88	192	22.2	Routine
8/9/2021	5:54	Low Tide Falling	Cloudy	South-Southwest	Light (0-5 mph)	88	159	21.8	Routine
8/16/2021	5:56	High Tide Falling	Rain	North-Northeast	Moderate (10-15 mph)	87	42	14.8	Routine
8/23/2021	5:47	Low Tide Falling	Cloudy	Northwest	Moderate-Light (5-10 mph)	88	20	18.0	Routine

Grand Isle State Park

GISP2   *Beach Name* *Grand Isle State Park - 2*

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/6/2021	6:01	High Tide	Clear	East	Moderate-Light (5-10 mph)	71	10	19.9	Routine
4/13/2021	6:20	Low Tide Falling	Cloudy	East-Southeast	Moderate (10-15 mph)	71	10	13.8	Routine
4/20/2021	6:03	High Tide Rising	Cloudy	East-Northeast	Moderate-Light (5-10 mph)	72	10	17.1	Routine
4/26/2021	6:30	High Tide	Clear	East	Moderate-Light (5-10 mph)	72	10	18.4	Routine
5/4/2021	6:30	Low Tide Falling	Scattered Clouds	South-Southeast	Moderate-Light (5-10 mph)	77	10	19.7	Routine
5/11/2021	6:05	High Tide	Cloudy	South	Moderate (10-15 mph)	78	10	12.3	Routine
5/25/2021	6:20	High Tide	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	78	20	10.2	Routine
6/1/2021	6:16	Low Tide	Scattered Clouds	East-Southeast	Moderate (10-15 mph)	78	10	14.4	Routine

Beach

Station ID

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
6/7/2021	6:09	High Tide Falling	Partly Cloudy	Southeast	Moderate (10-15 mph)	82	124	14.1	Routine
6/14/2021	6:13	Low Tide Falling	Partly Cloudy	South-Southwest	Light (0-5 mph)	84	10	18.0	Routine
6/21/2021	6:04	High Tide Falling	Light Rain	South	Moderate (10-15 mph)	83	64	28.2	Routine
6/28/2021	5:54	Low Tide Falling	Cloudy	East	Moderate (10-15 mph)	84	10	11.4	Routine
7/6/2021	5:54	High Tide	Rain	South	Calm (0 mph)	82	2005	12.5	Routine
7/12/2021	5:46	Low Tide Falling	Cloudy	South-Southwest	Moderate (10-15 mph)	83	87	14.6	Routine
7/19/2021	5:53	High Tide Falling	Partly Cloudy	Southwest	Moderate-Light (5-10 mph)	83	99	17.3	Routine
7/26/2021	5:53	Low Tide Falling	Partly Cloudy	South-Southeast	Light (0-5 mph)	86	53	22.2	Routine
8/2/2021	5:57	High Tide Falling	Light Rain	West	Moderate-Light (5-10 mph)	88	288	22.1	Routine
8/9/2021	5:54	Low Tide Falling	Cloudy	South-Southwest	Light (0-5 mph)	88	238	21.8	Routine
8/16/2021	5:56	High Tide Falling	Rain	North-Northeast	Moderate (10-15 mph)	87	31	14.8	Routine
8/23/2021	5:47	Low Tide Falling	Cloudy	Northwest	Moderate-Light (5-10 mph)	88	31	17.9	Routine

Grand Isle State Park

GISP3   ***Beach Name*** *Grand Isle State Park - 3*

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/6/2021	6:01	High Tide	Clear	East	Moderate-Light (5-10 mph)	71	10	20.0	Routine
4/13/2021	6:20	Low Tide Falling	Cloudy	East-Southeast	Moderate (10-15 mph)	71	20	13.8	Routine
4/20/2021	6:03	High Tide Rising	Cloudy	East-Northeast	Moderate-Light (5-10 mph)	72	10	13.8	Routine
4/26/2021	6:30	High Tide	Clear	East	Moderate-Light (5-10 mph)	72	10	19.4	Field Duplicate
4/26/2021	6:30	High Tide	Clear	East	Moderate-Light (5-10 mph)	72	10	18.5	Routine
5/4/2021	6:30	Low Tide Falling	Scattered Clouds	South-Southeast	Moderate-Light (5-10 mph)	77	31	20.3	Routine
5/11/2021	6:05	High Tide	Cloudy	South	Moderate (10-15 mph)	78	42	12.9	Routine
5/25/2021	6:20	High Tide	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	78	20	10.0	Routine
6/1/2021	6:16	Low Tide	Scattered Clouds	East-Southeast	Moderate (10-15 mph)	79	10	15.0	Routine
6/7/2021	6:09	High Tide Falling	Partly Cloudy	Southeast	Moderate (10-15 mph)	82	164	13.4	Routine
6/14/2021	6:13	Low Tide Falling	Partly Cloudy	South-Southwest	Light (0-5 mph)	84	10	18.0	Routine
6/21/2021	6:04	High Tide Falling	Light Rain	South	Moderate (10-15 mph)	83	75	28.2	Routine
6/28/2021	5:54	Low Tide Falling	Cloudy	East	Moderate (10-15 mph)	84	31	11.6	Routine
7/6/2021	5:54	High Tide	Rain	South	Calm (0 mph)	82	2005	12.8	Routine
7/12/2021	5:46	Low Tide Falling	Cloudy	South-Southwest	Moderate (10-15 mph)	83	31	14.6	Routine
7/19/2021	5:53	High Tide Falling	Partly Cloudy	Southwest	Moderate-Light (5-10 mph)	83	178	18.3	Routine
7/26/2021	5:53	Low Tide Falling	Partly Cloudy	South-Southeast	Light (0-5 mph)	86	42	22.4	Routine
8/2/2021	5:57	High Tide Falling	Light Rain	West	Moderate-Light (5-10 mph)	88	429	22.4	Routine
8/9/2021	5:54	Low Tide Falling	Cloudy	South-Southwest	Light (0-5 mph)	88	192	21.8	Routine

Beach

Station ID

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
8/16/2021	5:56	High Tide Falling	Rain	North-Northeast	Moderate (10-15 mph)	87	10	15.0	Routine
8/23/2021	5:47	Low Tide Falling	Cloudy	Northwest	Moderate-Light (5-10 mph)	88	53	18.4	Routine

Grand Isle State Park

GISP4   *Beach Name Grand Isle State Park - 4*

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/6/2021	6:01	High Tide	Clear	East	Moderate-Light (5-10 mph)	71	20	19.9	Routine
4/13/2021	6:20	Low Tide Falling	Cloudy	East-Southeast	Moderate (10-15 mph)	71	10	13.9	Routine
4/20/2021	6:03	High Tide Rising	Cloudy	East-Northeast	Moderate-Light (5-10 mph)	72	10	7.6	Routine
4/26/2021	6:30	High Tide	Clear	East	Moderate-Light (5-10 mph)	72	10	18.1	Routine
5/4/2021	6:30	Low Tide Falling	Scattered Clouds	South-Southeast	Moderate-Light (5-10 mph)	77	10	19.6	Routine
5/11/2021	6:05	High Tide	Cloudy	South	Moderate (10-15 mph)	78	42	12.9	Routine
5/25/2021	6:20	High Tide	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	78	10	10.0	Routine
6/1/2021	6:16	Low Tide	Scattered Clouds	East-Southeast	Moderate (10-15 mph)	79	10	15.4	Routine
6/7/2021	6:09	High Tide Falling	Partly Cloudy	Southeast	Moderate (10-15 mph)	82	124	13.4	Routine
6/14/2021	6:13	Low Tide Falling	Partly Cloudy	South-Southwest	Light (0-5 mph)	84	10	17.8	Routine
6/21/2021	6:04	High Tide Falling	Light Rain	South	Moderate (10-15 mph)	83	31	28.3	Routine
6/28/2021	5:54	Low Tide Falling	Cloudy	East	Moderate (10-15 mph)	84	10	11.1	Routine
7/6/2021	5:54	High Tide	Rain	South	Calm (0 mph)	82	2005	12.4	Routine
7/12/2021	5:46	Low Tide Falling	Cloudy	South-Southwest	Moderate (10-15 mph)	83	53	14.3	Routine
7/19/2021	5:53	High Tide Falling	Partly Cloudy	Southwest	Moderate-Light (5-10 mph)	83	31	17.9	Routine
7/26/2021	5:53	Low Tide Falling	Partly Cloudy	South-Southeast	Light (0-5 mph)	86	53	22.0	Routine
8/2/2021	5:57	High Tide Falling	Light Rain	West	Moderate-Light (5-10 mph)	88	384	22.5	Routine
8/9/2021	5:54	Low Tide Falling	Cloudy	South-Southwest	Light (0-5 mph)	88	178	21.7	Routine
8/16/2021	5:56	High Tide Falling	Rain	North-Northeast	Moderate (10-15 mph)	87	124	15.0	Routine
8/23/2021	5:47	Low Tide Falling	Cloudy	Northwest	Moderate-Light (5-10 mph)	88	31	18.4	Routine

Gulf Breeze

GBRZ1   *Beach Name Gulf Breeze*

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/5/2021	7:00	Low Tide	Scattered Clouds	Southeast	Light (0-5 mph)	67	10	21.5	Routine
4/12/2021	7:00	High Tide	Clear	East-Southeast	Light (0-5 mph)	73	10	11.8	Routine
4/19/2021	7:00	Low Tide Falling	Scattered Clouds	North-Northeast	Light (0-5 mph)	72	10	20.3	Routine
4/26/2021	7:00	High Tide Falling	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	70	10	23.3	Routine
5/3/2021	7:00	Low Tide Falling	Cloudy	South	Moderate-Strong (15-20 mph)	73	10	10.7	Routine
5/10/2021	7:00	High Tide Falling	Cloudy	South-Southeast	Moderate (10-15 mph)	76	20	16.1	Routine

Beach

Station ID

	Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero- cocci	Salinity	Sample Type
	5/24/2021	7:00	High Tide Falling	Rain	East-Southeast	Moderate (10-15 mph)	76	64	7.8	Field Duplicate
	5/24/2021	7:00	High Tide Falling	Rain	East-Southeast	Moderate (10-15 mph)	76	53	7.8	Routine
	6/1/2021	7:00	Low Tide Falling	Cloudy	South-Southeast	Moderate-Light (5-10 mph)	80	42	13.4	Routine
	6/8/2021	7:00	High Tide Falling	Partly Cloudy	South-Southeast	Moderate (10-15 mph)	81	75	10.4	Routine
	6/15/2021	7:00	Low Tide Falling	Scattered Clouds	South-Southeast	Light (0-5 mph)	85	75	24.2	Routine
	6/22/2021	7:00	High Tide Falling	Cloudy	West	Moderate-Light (5-10 mph)	85	75	19.8	Routine
	6/29/2021	7:00	High Tide	Cloudy	East-Southeast	Moderate (10-15 mph)	86	87	15.1	Routine
	7/6/2021	7:00	High Tide Falling	Cloudy	Southeast	Light (0-5 mph)	85	10	13.6	Routine
	7/13/2021	7:00	High Tide	Clear	South-Southeast	Light (0-5 mph)	85	53	18.9	Routine
	7/20/2021	7:15	Low Tide	Rain	Southwest	Moderate-Light (5-10 mph)	86	238	18.7	Routine
	7/20/2021	7:15	Low Tide	Rain	Southwest	Moderate-Light (5-10 mph)	86	254	18.7	Field Duplicate
	7/27/2021	7:10	High Tide	Light Rain	South-Southwest	Light (0-5 mph)	86	31	27.4	Routine
	8/3/2021	7:00	High Tide Falling	Light Rain	West	Light (0-5 mph)	88	150	30.1	Routine
	8/3/2021	7:00	High Tide Falling	Light Rain	West	Light (0-5 mph)	88	178	30.2	Field Split
	8/10/2021	7:00	Low Tide Falling	Scattered Clouds	South	Moderate-Light (5-10 mph)	87	10	27.6	Routine
	8/17/2021	7:00	Low Tide Falling	Rain	South-Southeast	Light (0-5 mph)	88	42	19.8	Routine
	8/24/2021	7:00	High Tide Falling	Clear	Northwest	Light (0-5 mph)	89	10	19.7	Routine
	9/21/2021	7:00	High Tide Falling	Scattered Clouds	West-Southwest	Light (0-5 mph)	84	10	23.9	Routine
	9/28/2021	7:10	High Tide Falling	Rain	West-Southwest	Moderate-Light (5-10 mph)	81	31	22.8	Routine
	10/5/2021	7:00	Low Tide	Clear	North	Light (0-5 mph)	82	10	18.9	Routine
	10/12/2021	7:00	Low Tide Falling	Cloudy	South	Moderate (10-15 mph)	82	20	19.6	Routine
	10/19/2021	7:00	High Tide Falling	Partly Cloudy	East-Northeast	Moderate-Light (5-10 mph)	80	10	20.4	Routine
	10/26/2021	7:00	High Tide Falling	Partly Cloudy	East	Moderate (10-15 mph)	80	10	20.2	Routine

Holly Beach

HOLLY1   *Beach Name Holly Beach - 1*

	Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero- cocci	Salinity	Sample Type
	4/5/2021	7:00	Low Tide	Scattered Clouds	Southeast	Light (0-5 mph)	67	10	18.8	Routine
	4/12/2021	7:00	High Tide	Clear	East-Southeast	Light (0-5 mph)	73	20	12.0	Routine
	4/19/2021	7:00	Low Tide Falling	Scattered Clouds	North-Northeast	Light (0-5 mph)	72	10	21.8	Routine
	4/26/2021	7:00	High Tide Falling	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	70	10	22.6	Routine
	5/3/2021	7:00	Low Tide Falling	Cloudy	South	Moderate-Strong (15-20 mph)	73	42	9.9	Routine
	5/3/2021	7:00	Low Tide Falling	Cloudy	South	Moderate-Strong (15-20 mph)	73	20	9.9	Field Duplicate
	5/10/2021	7:00	High Tide Falling	Cloudy	South-Southeast	Moderate (10-15 mph)	76	10	15.1	Routine
	5/24/2021	7:00	High Tide Falling	Rain	East-Southeast	Moderate (10-15 mph)	77	20	5.8	Routine

Beach

Station ID

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
6/1/2021	7:00	Low Tide Falling	Cloudy	South-Southeast	Moderate-Light (5-10 mph)	80	306	13.1	Routine
6/8/2021	7:00	High Tide Falling	Partly Cloudy	South-Southeast	Moderate (10-15 mph)	81	1652	11.9	Routine
6/15/2021	7:00	Low Tide Falling	Scattered Clouds	South-Southeast	Light (0-5 mph)	85	53	23.2	Routine
6/22/2021	7:00	High Tide Falling	Cloudy	West	Moderate-Light (5-10 mph)	85	782	20.5	Routine
6/29/2021	7:00	High Tide	Cloudy	East-Southeast	Moderate (10-15 mph)	86	53	13.8	Routine
7/6/2021	7:00	High Tide Falling	Cloudy	Southeast	Light (0-5 mph)	85	10	13.0	Routine
7/13/2021	7:00	High Tide	Clear	South-Southeast	Light (0-5 mph)	85	10	17.8	Routine
7/20/2021	7:15	Low Tide	Rain	Southwest	Moderate-Light (5-10 mph)	86	20	17.1	Routine
7/27/2021	7:10	High Tide	Light Rain	South-Southwest	Light (0-5 mph)	86	31	27.7	Routine
8/3/2021	7:00	High Tide Falling	Light Rain	West	Light (0-5 mph)	88	429	29.0	Routine
8/10/2021	7:00	Low Tide Falling	Scattered Clouds	South	Moderate-Light (5-10 mph)	87	53	27.6	Routine
8/17/2021	7:00	Low Tide Falling	Rain	South-Southeast	Light (0-5 mph)	88	453	18.8	Routine
8/17/2021	7:00	Low Tide Falling	Rain	South-Southeast	Light (0-5 mph)	88	478	18.7	Field Split
8/24/2021	7:00	High Tide Falling	Clear	Northwest	Light (0-5 mph)	89	10	18.8	Routine
9/21/2021	7:00	High Tide Falling	Scattered Clouds	West-Southwest	Light (0-5 mph)	84	10	24.1	Routine
9/28/2021	7:10	High Tide Falling	Rain	West-Southwest	Moderate-Light (5-10 mph)	81	42	21.7	Routine
10/5/2021	7:00	Low Tide	Clear	North	Light (0-5 mph)	82	10	18.3	Routine
10/5/2021	7:00	Low Tide	Clear	North	Light (0-5 mph)	82	31	18.3	Field Split
10/12/2021	7:00	Low Tide Falling	Cloudy	South	Moderate (10-15 mph)	82	10	19.4	Routine
10/19/2021	7:00	High Tide Falling	Partly Cloudy	East-Northeast	Moderate-Light (5-10 mph)	80	10	22.5	Routine
10/26/2021	7:00	High Tide Falling	Partly Cloudy	East	Moderate (10-15 mph)	80	10	18.7	Routine

Holly Beach

HOLLY2   ***Beach Name*** *Holly Beach - 2*

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/5/2021	7:00	Low Tide	Scattered Clouds	Southeast	Light (0-5 mph)	67	10	18.9	Routine
4/12/2021	7:00	High Tide	Clear	East-Southeast	Light (0-5 mph)	73	10	12.1	Routine
4/19/2021	7:00	Low Tide Falling	Scattered Clouds	North-Northeast	Light (0-5 mph)	72	10	22.1	Routine
4/26/2021	7:00	High Tide Falling	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	70	20	22.8	Routine
5/3/2021	7:00	Low Tide Falling	Cloudy	South	Moderate-Strong (15-20 mph)	73	31	9.8	Routine
5/10/2021	7:00	High Tide Falling	Cloudy	South-Southeast	Moderate (10-15 mph)	76	10	15.1	Routine
5/24/2021	7:00	High Tide Falling	Rain	East-Southeast	Moderate (10-15 mph)	77	75	5.8	Field Split
5/24/2021	7:00	High Tide Falling	Rain	East-Southeast	Moderate (10-15 mph)	77	42	5.9	Routine
6/1/2021	7:00	Low Tide Falling	Cloudy	South-Southeast	Moderate-Light (5-10 mph)	80	150	13.2	Routine
6/8/2021	7:00	High Tide Falling	Partly Cloudy	South-Southeast	Moderate (10-15 mph)	81	1445	12.1	Routine

Beach

Station ID

	Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
	6/15/2021	7:00	Low Tide Falling	Scattered Clouds	South-Southeast	Light (0-5 mph)	85	20	23.5	Routine
	6/15/2021	7:00	Low Tide Falling	Scattered Clouds	South-Southeast	Light (0-5 mph)	85	150	23.6	Field Split
	6/22/2021	7:00	High Tide Falling	Cloudy	West	Moderate-Light (5-10 mph)	85	384	20.8	Field Duplicate
	6/22/2021	7:00	High Tide Falling	Cloudy	West	Moderate-Light (5-10 mph)	85	324	20.8	Routine
	6/29/2021	7:00	High Tide	Cloudy	East-Southeast	Moderate (10-15 mph)	86	31	13.9	Routine
	7/6/2021	7:00	High Tide Falling	Cloudy	Southeast	Light (0-5 mph)	85	10	13.1	Routine
	7/13/2021	7:00	High Tide	Clear	South-Southeast	Light (0-5 mph)	85	10	18.0	Routine
	7/20/2021	7:15	Low Tide	Rain	Southwest	Moderate-Light (5-10 mph)	86	10	17.2	Routine
	7/27/2021	7:10	High Tide	Light Rain	South-Southwest	Light (0-5 mph)	86	20	27.9	Routine
	8/3/2021	7:00	High Tide Falling	Light Rain	West	Light (0-5 mph)	88	178	29.2	Routine
	8/10/2021	7:00	Low Tide Falling	Scattered Clouds	South	Moderate-Light (5-10 mph)	87	75	27.6	Routine
	8/17/2021	7:00	Low Tide Falling	Rain	South-Southeast	Light (0-5 mph)	88	364	18.8	Routine
	8/24/2021	7:00	High Tide Falling	Clear	Northwest	Light (0-5 mph)	89	31	18.9	Routine
	9/21/2021	7:00	High Tide Falling	Scattered Clouds	West-Southwest	Light (0-5 mph)	84	10	24.2	Routine
	9/28/2021	7:10	High Tide Falling	Rain	West-Southwest	Moderate-Light (5-10 mph)	81	64	22.0	Routine
	10/5/2021	7:00	Low Tide	Clear	North	Light (0-5 mph)	82	20	18.6	Routine
	10/12/2021	7:00	Low Tide Falling	Cloudy	South	Moderate (10-15 mph)	82	20	19.5	Routine
	10/19/2021	7:00	High Tide Falling	Partly Cloudy	East-Northeast	Moderate-Light (5-10 mph)	80	10	22.7	Routine
	10/26/2021	7:00	High Tide Falling	Partly Cloudy	East	Moderate (10-15 mph)	80	10	18.9	Routine

Holly Beach

HOLLY3   **Beach Name** *Holly Beach - 3*

	Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
	4/5/2021	7:00	Low Tide	Scattered Clouds	Southeast	Light (0-5 mph)	67	10	18.7	Routine
	4/12/2021	7:00	High Tide	Clear	East-Southeast	Light (0-5 mph)	73	10	12.0	Routine
	4/19/2021	7:00	Low Tide Falling	Scattered Clouds	North-Northeast	Light (0-5 mph)	72	10	22.0	Routine
	4/26/2021	7:00	High Tide Falling	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	70	10	22.5	Routine
	5/3/2021	7:00	Low Tide Falling	Cloudy	South	Moderate-Strong (15-20 mph)	73	137	9.8	Routine
	5/10/2021	7:00	High Tide Falling	Cloudy	South-Southeast	Moderate (10-15 mph)	76	20	15.1	Routine
	5/24/2021	7:00	High Tide Falling	Rain	East-Southeast	Moderate (10-15 mph)	77	42	5.9	Routine
	6/1/2021	7:00	Low Tide Falling	Cloudy	South-Southeast	Moderate-Light (5-10 mph)	80	238	13.1	Routine
	6/8/2021	7:00	High Tide Falling	Partly Cloudy	South-Southeast	Moderate (10-15 mph)	81	1296	12.2	Routine
	6/15/2021	7:00	Low Tide Falling	Scattered Clouds	South-Southeast	Light (0-5 mph)	85	124	23.6	Routine
	6/22/2021	7:00	High Tide Falling	Cloudy	West	Moderate-Light (5-10 mph)	85	324	20.7	Routine
	6/29/2021	7:00	High Tide	Cloudy	East-Southeast	Moderate (10-15 mph)	86	42	13.8	Routine

Beach

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
7/6/2021	7:00	High Tide Falling	Cloudy	Southeast	Light (0-5 mph)	85	20	13.0	Field Duplicate
7/6/2021	7:00	High Tide Falling	Cloudy	Southeast	Light (0-5 mph)	85	10	13.0	Routine
7/13/2021	7:00	High Tide	Clear	South-Southeast	Light (0-5 mph)	85	31	17.9	Routine
7/20/2021	7:15	Low Tide	Rain	Southwest	Moderate-Light (5-10 mph)	86	53	17.0	Routine
7/27/2021	7:10	High Tide	Light Rain	South-Southwest	Light (0-5 mph)	86	64	27.8	Routine
8/3/2021	7:00	High Tide Falling	Light Rain	West	Light (0-5 mph)	88	164	28.9	Routine
8/10/2021	7:00	Low Tide Falling	Scattered Clouds	South	Moderate-Light (5-10 mph)	87	75	27.2	Routine
8/17/2021	7:00	Low Tide Falling	Rain	South-Southeast	Light (0-5 mph)	88	362	18.6	Routine
8/24/2021	7:00	High Tide Falling	Clear	Northwest	Light (0-5 mph)	89	124	18.8	Routine
9/21/2021	7:00	High Tide Falling	Scattered Clouds	West-Southwest	Light (0-5 mph)	84	10	24.1	Routine
9/28/2021	7:10	High Tide Falling	Rain	West-Southwest	Moderate-Light (5-10 mph)	81	31	21.7	Routine
10/5/2021	7:00	Low Tide	Clear	North	Light (0-5 mph)	82	10	18.4	Routine
10/12/2021	7:00	Low Tide Falling	Cloudy	South	Moderate (10-15 mph)	82	31	19.3	Routine
10/19/2021	7:00	High Tide Falling	Partly Cloudy	East-Northeast	Moderate-Light (5-10 mph)	80	10	22.6	Routine
10/26/2021	7:00	High Tide Falling	Partly Cloudy	East	Moderate (10-15 mph)	80	10	18.8	Routine

Holly Beach

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/5/2021	7:00	Low Tide	Scattered Clouds	Southeast	Light (0-5 mph)	67	10	19.0	Routine
4/12/2021	7:00	High Tide	Clear	East-Southeast	Light (0-5 mph)	73	20	12.0	Routine
4/19/2021	7:00	Low Tide Falling	Scattered Clouds	North-Northeast	Light (0-5 mph)	72	10	20.6	Routine
4/26/2021	7:00	High Tide Falling	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	70	10	22.4	Routine
5/3/2021	7:00	Low Tide Falling	Cloudy	South	Moderate-Strong (15-20 mph)	73	42	9.9	Routine
5/10/2021	7:00	High Tide Falling	Cloudy	South-Southeast	Moderate (10-15 mph)	76	20	14.9	Routine
5/24/2021	7:00	High Tide Falling	Rain	East-Southeast	Moderate (10-15 mph)	77	99	6.0	Routine
6/1/2021	7:00	Low Tide Falling	Cloudy	South-Southeast	Moderate-Light (5-10 mph)	80	207	12.9	Routine
6/1/2021	7:00	Low Tide Falling	Cloudy	South-Southeast	Moderate-Light (5-10 mph)	80	124	12.9	Field Duplicate
6/8/2021	7:00	High Tide Falling	Partly Cloudy	South-Southeast	Moderate (10-15 mph)	81	1013	12.2	Routine
6/15/2021	7:00	Low Tide Falling	Scattered Clouds	South-Southeast	Light (0-5 mph)	85	192	23.3	Routine
6/22/2021	7:00	High Tide Falling	Cloudy	West	Moderate-Light (5-10 mph)	85	324	20.5	Routine
6/29/2021	7:00	High Tide	Cloudy	East-Southeast	Moderate (10-15 mph)	86	31	13.7	Routine
7/6/2021	7:00	High Tide Falling	Cloudy	Southeast	Light (0-5 mph)	85	31	13.0	Routine
7/13/2021	7:00	High Tide	Clear	South-Southeast	Light (0-5 mph)	85	20	18.0	Routine
7/20/2021	7:15	Low Tide	Rain	Southwest	Moderate-Light (5-10 mph)	86	31	17.0	Routine

Beach

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
7/27/2021	7:10	High Tide	Light Rain	South-Southwest	Light (0-5 mph)	86	20	27.8	Routine
8/3/2021	7:00	High Tide Falling	Light Rain	West	Light (0-5 mph)	88	429	29.0	Routine
8/10/2021	7:00	Low Tide Falling	Scattered Clouds	South	Moderate-Light (5-10 mph)	87	10	27.0	Routine
8/17/2021	7:00	Low Tide Falling	Rain	South-Southeast	Light (0-5 mph)	88	344	18.5	Routine
8/24/2021	7:00	High Tide Falling	Clear	Northwest	Light (0-5 mph)	89	42	18.6	Routine
9/21/2021	7:00	High Tide Falling	Scattered Clouds	West-Southwest	Light (0-5 mph)	84	87	24.3	Routine
9/28/2021	7:10	High Tide Falling	Rain	West-Southwest	Moderate-Light (5-10 mph)	81	10	21.6	Routine
10/5/2021	7:00	Low Tide	Clear	North	Light (0-5 mph)	82	10	18.3	Routine
10/12/2021	7:00	Low Tide Falling	Cloudy	South	Moderate (10-15 mph)	82	10	19.3	Routine
10/19/2021	7:00	High Tide Falling	Partly Cloudy	East-Northeast	Moderate-Light (5-10 mph)	80	10	22.3	Routine
10/26/2021	7:00	High Tide Falling	Partly Cloudy	East	Moderate (10-15 mph)	80	10	18.7	Routine

Holly Beach

Beach Name *Holly Beach - 5*

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/5/2021	7:00	Low Tide	Scattered Clouds	Southeast	Light (0-5 mph)	67	10	19.0	Routine
4/12/2021	7:00	High Tide	Clear	East-Southeast	Light (0-5 mph)	73	10	12.1	Routine
4/19/2021	7:00	Low Tide Falling	Scattered Clouds	North-Northeast	Light (0-5 mph)	72	10	21.3	Routine
4/26/2021	7:00	High Tide Falling	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	70	10	22.5	Routine
4/26/2021	7:00	High Tide Falling	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	70	10	22.4	Field Duplicate
5/3/2021	7:00	Low Tide Falling	Cloudy	South	Moderate-Strong (15-20 mph)	73	42	9.8	Routine
5/10/2021	7:00	High Tide Falling	Cloudy	South-Southeast	Moderate (10-15 mph)	76	20	15.4	Routine
5/24/2021	7:00	High Tide Falling	Rain	East-Southeast	Moderate (10-15 mph)	77	111	6.0	Routine
6/1/2021	7:00	Low Tide Falling	Cloudy	South-Southeast	Moderate-Light (5-10 mph)	80	306	13.0	Routine
6/8/2021	7:00	High Tide Falling	Partly Cloudy	South-Southeast	Moderate (10-15 mph)	81	697	12.3	Routine
6/15/2021	7:00	Low Tide Falling	Scattered Clouds	South-Southeast	Light (0-5 mph)	85	99	23.3	Routine
6/22/2021	7:00	High Tide Falling	Cloudy	West	Moderate-Light (5-10 mph)	85	504	20.5	Routine
6/29/2021	7:00	High Tide	Cloudy	East-Southeast	Moderate (10-15 mph)	86	87	13.8	Routine
7/6/2021	7:00	High Tide Falling	Cloudy	Southeast	Light (0-5 mph)	85	53	13.0	Routine
7/13/2021	7:00	High Tide	Clear	South-Southeast	Light (0-5 mph)	85	10	18.0	Routine
7/20/2021	7:15	Low Tide	Rain	Southwest	Moderate-Light (5-10 mph)	86	10	17.0	Routine
7/27/2021	7:10	High Tide	Light Rain	South-Southwest	Light (0-5 mph)	86	31	28.1	Routine
8/3/2021	7:00	High Tide Falling	Light Rain	West	Light (0-5 mph)	88	254	28.9	Routine
8/10/2021	7:00	Low Tide Falling	Scattered Clouds	South	Moderate-Light (5-10 mph)	87	42	27.2	Routine
8/17/2021	7:00	Low Tide Falling	Rain	South-Southeast	Light (0-5 mph)	88	306	18.6	Routine

Beach

Station ID

	Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
	8/24/2021	7:00	High Tide Falling	Clear	Northwest	Light (0-5 mph)	89	10	18.7	Routine
	9/21/2021	7:00	High Tide Falling	Scattered Clouds	West-Southwest	Light (0-5 mph)	84	10	24.1	Routine
	9/28/2021	7:10	High Tide Falling	Rain	West-Southwest	Moderate-Light (5-10 mph)	81	20	21.8	Field Split
	9/28/2021	7:10	High Tide Falling	Rain	West-Southwest	Moderate-Light (5-10 mph)	81	20	21.5	Routine
	10/5/2021	7:00	Low Tide	Clear	North	Light (0-5 mph)	82	10	18.3	Routine
	10/12/2021	7:00	Low Tide Falling	Cloudy	South	Moderate (10-15 mph)	82	31	19.3	Routine
	10/19/2021	7:00	High Tide Falling	Partly Cloudy	East-Northeast	Moderate-Light (5-10 mph)	80	10	22.5	Routine
	10/26/2021	7:00	High Tide Falling	Partly Cloudy	East	Moderate (10-15 mph)	80	10	18.7	Routine
	10/26/2021	7:00	High Tide Falling	Partly Cloudy	East	Moderate (10-15 mph)	80	10	18.8	Field Duplicate

Holly Beach

HOLLY6   ***Beach Name*** *Holly Beach - 6*

	Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
	4/5/2021	7:00	Low Tide	Scattered Clouds	Southeast	Light (0-5 mph)	67	10	19.1	Routine
	4/12/2021	7:00	High Tide	Clear	East-Southeast	Light (0-5 mph)	73	10	12.2	Routine
	4/19/2021	7:00	Low Tide Falling	Scattered Clouds	North-Northeast	Light (0-5 mph)	72	10	21.8	Routine
	4/26/2021	7:00	High Tide Falling	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	70	10	22.6	Routine
	5/3/2021	7:00	Low Tide Falling	Cloudy	South	Moderate-Strong (15-20 mph)	73	42	9.8	Routine
	5/10/2021	7:00	High Tide Falling	Cloudy	South-Southeast	Moderate (10-15 mph)	76	20	15.3	Field Duplicate
	5/10/2021	7:00	High Tide Falling	Cloudy	South-Southeast	Moderate (10-15 mph)	76	10	15.3	Routine
	5/24/2021	7:00	High Tide Falling	Rain	East-Southeast	Moderate (10-15 mph)	77	64	6.0	Routine
	6/1/2021	7:00	Low Tide Falling	Cloudy	South-Southeast	Moderate-Light (5-10 mph)	80	406	13.2	Routine
	6/8/2021	7:00	High Tide Falling	Partly Cloudy	South-Southeast	Moderate (10-15 mph)	81	624	12.5	Routine
	6/15/2021	7:00	Low Tide Falling	Scattered Clouds	South-Southeast	Light (0-5 mph)	85	137	23.6	Routine
	6/22/2021	7:00	High Tide Falling	Cloudy	West	Moderate-Light (5-10 mph)	85	2005	20.6	Routine
	6/29/2021	7:00	High Tide	Cloudy	East-Southeast	Moderate (10-15 mph)	86	10	13.8	Routine
	7/6/2021	7:00	High Tide Falling	Cloudy	Southeast	Light (0-5 mph)	85	20	12.9	Routine
	7/13/2021	7:00	High Tide	Clear	South-Southeast	Light (0-5 mph)	85	99	18.0	Routine
	7/20/2021	7:15	Low Tide	Rain	Southwest	Moderate-Light (5-10 mph)	86	42	17.1	Routine
	7/27/2021	7:10	High Tide	Light Rain	South-Southwest	Light (0-5 mph)	86	42	28.2	Routine
	8/3/2021	7:00	High Tide Falling	Light Rain	West	Light (0-5 mph)	88	531	28.8	Routine
	8/10/2021	7:00	Low Tide Falling	Scattered Clouds	South	Moderate-Light (5-10 mph)	87	87	27.0	Routine
	8/17/2021	7:00	Low Tide Falling	Rain	South-Southeast	Light (0-5 mph)	88	254	18.5	Routine
	8/24/2021	7:00	High Tide Falling	Clear	Northwest	Light (0-5 mph)	89	20	18.7	Routine
	9/21/2021	7:00	High Tide Falling	Scattered Clouds	West-Southwest	Light (0-5 mph)	84	10	24.2	Routine

Beach

Station ID

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
9/28/2021	7:10	High Tide Falling	Rain	West-Southwest	Moderate-Light (5-10 mph)	81	20	21.7	Routine
10/5/2021	7:00	Low Tide	Clear	North	Light (0-5 mph)	82	64	18.4	Routine
10/12/2021	7:00	Low Tide Falling	Cloudy	South	Moderate (10-15 mph)	82	10	19.7	Routine
10/19/2021	7:00	High Tide Falling	Partly Cloudy	East-Northeast	Moderate-Light (5-10 mph)	80	10	22.6	Routine
10/26/2021	7:00	High Tide Falling	Partly Cloudy	East	Moderate (10-15 mph)	80	20	18.8	Field Duplicate
10/26/2021	7:00	High Tide Falling	Partly Cloudy	East	Moderate (10-15 mph)	80	10	18.5	Routine

Little Florida

LTFL1   ***Beach Name*** *Little Florida*

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/5/2021	7:00	Low Tide	Scattered Clouds	Southeast	Light (0-5 mph)	67	64	21.6	Routine
4/12/2021	7:00	High Tide	Clear	East-Southeast	Light (0-5 mph)	73	10	11.9	Routine
4/19/2021	7:00	Low Tide Falling	Scattered Clouds	North-Northeast	Light (0-5 mph)	72	87	20.0	Routine
4/26/2021	7:00	High Tide Falling	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	70	10	23.8	Routine
5/3/2021	7:00	Low Tide Falling	Cloudy	South	Moderate-Strong (15-20 mph)	73	31	10.8	Routine
5/10/2021	7:00	High Tide Falling	Cloudy	South-Southeast	Moderate (10-15 mph)	76	10	15.8	Routine
5/24/2021	7:00	High Tide Falling	Rain	East-Southeast	Moderate (10-15 mph)	77	87	8.1	Routine
6/1/2021	7:00	Low Tide Falling	Cloudy	South-Southeast	Moderate-Light (5-10 mph)	80	75	14.2	Routine
6/8/2021	7:00	High Tide Falling	Partly Cloudy	South-Southeast	Moderate (10-15 mph)	81	111	10.7	Routine
6/15/2021	7:00	Low Tide Falling	Scattered Clouds	South-Southeast	Light (0-5 mph)	85	20	24.6	Routine
6/22/2021	7:00	High Tide Falling	Cloudy	West	Moderate-Light (5-10 mph)	85	53	20.1	Routine
6/29/2021	7:00	High Tide	Cloudy	East-Southeast	Moderate (10-15 mph)	86	75	15.4	Routine
7/6/2021	7:00	High Tide Falling	Cloudy	Southeast	Light (0-5 mph)	85	10	13.6	Routine
7/13/2021	7:00	High Tide	Clear	South-Southeast	Light (0-5 mph)	85	53	18.8	Routine
7/20/2021	7:15	Low Tide	Rain	Southwest	Moderate-Light (5-10 mph)	86	31	18.9	Routine
7/27/2021	7:10	High Tide	Light Rain	South-Southwest	Light (0-5 mph)	86	150	27.7	Routine
8/3/2021	7:00	High Tide Falling	Light Rain	West	Light (0-5 mph)	88	111	30.5	Routine
8/10/2021	7:00	Low Tide Falling	Scattered Clouds	South	Moderate-Light (5-10 mph)	87	31	27.8	Routine
8/17/2021	7:00	Low Tide Falling	Rain	South-Southeast	Light (0-5 mph)	88	87	20.0	Routine
8/24/2021	7:00	High Tide Falling	Clear	Northwest	Light (0-5 mph)	89	20	19.3	Routine
9/21/2021	7:00	High Tide Falling	Scattered Clouds	West-Southwest	Light (0-5 mph)	84	10	24.2	Routine
9/28/2021	7:10	High Tide Falling	Rain	West-Southwest	Moderate-Light (5-10 mph)	81	53	22.9	Routine
10/5/2021	7:00	Low Tide	Clear	North	Light (0-5 mph)	82	10	19.0	Routine
10/12/2021	7:00	Low Tide Falling	Cloudy	South	Moderate (10-15 mph)	82	10	20.2	Routine
10/19/2021	7:00	High Tide Falling	Partly Cloudy	East-Northeast	Moderate-Light (5-10 mph)	80	31	20.6	Routine

Beach

Station ID

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
10/26/2021	7:00	High Tide Falling	Partly Cloudy	East	Moderate (10-15 mph)	80	10	20.8	Routine

Long Beach

DUNG1   ***Beach Name*** *Long Beach*

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/5/2021	7:00	Low Tide	Scattered Clouds	Southeast	Light (0-5 mph)	67	20	21.4	Routine
4/12/2021	7:00	High Tide	Clear	East-Southeast	Light (0-5 mph)	73	10	12.0	Routine
4/19/2021	7:00	Low Tide Falling	Scattered Clouds	North-Northeast	Light (0-5 mph)	72	42	19.6	Field Duplicate
4/19/2021	7:00	Low Tide Falling	Scattered Clouds	North-Northeast	Light (0-5 mph)	72	10	19.7	Routine
4/26/2021	7:00	High Tide Falling	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	70	10	23.5	Routine
5/3/2021	7:00	Low Tide Falling	Cloudy	South	Moderate-Strong (15-20 mph)	73	306	10.7	Routine
5/10/2021	7:00	High Tide Falling	Cloudy	South-Southeast	Moderate (10-15 mph)	76	53	15.6	Routine
5/24/2021	7:00	High Tide Falling	Rain	East-Southeast	Moderate (10-15 mph)	76	42	8.2	Routine
6/1/2021	7:00	Low Tide Falling	Cloudy	South-Southeast	Moderate-Light (5-10 mph)	80	31	13.6	Routine
6/8/2021	7:00	High Tide Falling	Partly Cloudy	South-Southeast	Moderate (10-15 mph)	81	178	10.6	Routine
6/15/2021	7:00	Low Tide Falling	Scattered Clouds	South-Southeast	Light (0-5 mph)	85	10	24.7	Field Duplicate
6/15/2021	7:00	Low Tide Falling	Scattered Clouds	South-Southeast	Light (0-5 mph)	85	53	24.6	Routine
6/22/2021	7:00	High Tide Falling	Cloudy	West	Moderate-Light (5-10 mph)	85	254	18.7	Routine
6/29/2021	7:00	High Tide	Cloudy	East-Southeast	Moderate (10-15 mph)	86	207	14.6	Routine
7/6/2021	7:00	High Tide Falling	Cloudy	Southeast	Light (0-5 mph)	85	560	12.7	Routine
7/13/2021	7:00	High Tide	Clear	South-Southeast	Light (0-5 mph)	85	64	18.5	Routine
7/20/2021	7:15	Low Tide	Rain	Southwest	Moderate-Light (5-10 mph)	86	531	18.1	Routine
7/27/2021	7:10	High Tide	Light Rain	South-Southwest	Light (0-5 mph)	86	2005	26.5	Routine
8/3/2021	7:00	High Tide Falling	Light Rain	West	Light (0-5 mph)	88	1298	29.6	Routine
8/10/2021	7:00	Low Tide Falling	Scattered Clouds	South	Moderate-Light (5-10 mph)	87	10	27.4	Field Duplicate
8/10/2021	7:00	Low Tide Falling	Scattered Clouds	South	Moderate-Light (5-10 mph)	87	20	27.4	Routine
8/17/2021	7:00	Low Tide Falling	Rain	South-Southeast	Light (0-5 mph)	88	20	19.8	Routine
8/24/2021	7:00	High Tide Falling	Clear	Northwest	Light (0-5 mph)	89	10	20.1	Routine
9/21/2021	7:00	High Tide Falling	Scattered Clouds	West-Southwest	Light (0-5 mph)	84	20	23.7	Routine
9/28/2021	7:10	High Tide Falling	Rain	West-Southwest	Moderate-Light (5-10 mph)	81	20	22.6	Routine
10/5/2021	7:00	Low Tide	Clear	North	Light (0-5 mph)	82	10	18.6	Routine
10/5/2021	7:00	Low Tide	Clear	North	Light (0-5 mph)	82	31	18.6	Field Duplicate
10/12/2021	7:00	Low Tide Falling	Cloudy	South	Moderate (10-15 mph)	82	20	19.3	Routine
10/19/2021	7:00	High Tide Falling	Partly Cloudy	East-Northeast	Moderate-Light (5-10 mph)	80	10	20.0	Routine
10/26/2021	7:00	High Tide Falling	Partly Cloudy	East	Moderate (10-15 mph)	80	10	19.6	Routine

Beach

Station ID	Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type

Martin Beach

MART1　　　　　　　　**Beach Name** *Martin Beach*

	Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
	4/5/2021	7:00	Low Tide	Scattered Clouds	Southeast	Light (0-5 mph)	67	10	21.4	Routine
	4/5/2021	7:00	Low Tide	Scattered Clouds	Southeast	Light (0-5 mph)	67	31	21.3	Field Duplicate
	4/12/2021	7:00	High Tide	Clear	East-Southeast	Light (0-5 mph)	73	10	12.2	Routine
	4/19/2021	7:00	Low Tide Falling	Scattered Clouds	North-Northeast	Light (0-5 mph)	72	10	20.3	Routine
	4/26/2021	7:00	High Tide Falling	Scattered Clouds	Southeast	Moderate-Light (5-10 mph)	70	10	24.1	Routine
	5/3/2021	7:00	Low Tide Falling	Cloudy	South	Moderate-Strong (15-20 mph)	73	124	11.2	Routine
	5/10/2021	7:00	High Tide Falling	Cloudy	South-Southeast	Moderate (10-15 mph)	76	10	14.3	Routine
	5/24/2021	7:00	High Tide Falling	Rain	East-Southeast	Moderate (10-15 mph)	77	53	8.6	Routine
	6/1/2021	7:00	Low Tide Falling	Cloudy	South-Southeast	Moderate-Light (5-10 mph)	80	137	13.9	Routine
	6/8/2021	7:00	High Tide Falling	Partly Cloudy	South-Southeast	Moderate (10-15 mph)	81	99	11.2	Routine
	6/15/2021	7:00	Low Tide Falling	Scattered Clouds	South-Southeast	Light (0-5 mph)	85	10	25.4	Routine
	6/22/2021	7:00	High Tide Falling	Cloudy	West	Moderate-Light (5-10 mph)	85	64	21.8	Routine
	6/29/2021	7:00	High Tide	Cloudy	East-Southeast	Moderate (10-15 mph)	86	75	15.0	Routine
	7/6/2021	7:00	High Tide Falling	Cloudy	Southeast	Light (0-5 mph)	85	10	13.0	Routine
	7/6/2021	7:00	High Tide Falling	Cloudy	Southeast	Light (0-5 mph)	85	624	12.4	Field Duplicate
	7/13/2021	7:00	High Tide	Clear	South-Southeast	Light (0-5 mph)	85	178	18.6	Routine
	7/20/2021	7:15	Low Tide	Rain	Southwest	Moderate-Light (5-10 mph)	86	20	19.5	Routine
	7/27/2021	7:10	High Tide	Light Rain	South-Southwest	Light (0-5 mph)	86	192	28.0	Routine
	8/3/2021	7:00	High Tide Falling	Light Rain	West	Light (0-5 mph)	88	178	30.7	Routine
	8/10/2021	7:00	Low Tide Falling	Scattered Clouds	South	Moderate-Light (5-10 mph)	87	87	27.9	Routine
	8/17/2021	7:00	Low Tide Falling	Rain	South-Southeast	Light (0-5 mph)	88	31	20.3	Routine
	8/24/2021	7:00	High Tide Falling	Clear	Northwest	Light (0-5 mph)	89	10	19.4	Routine
	9/21/2021	7:00	High Tide Falling	Scattered Clouds	West-Southwest	Light (0-5 mph)	84	20	24.0	Routine
	9/28/2021	7:10	High Tide Falling	Rain	West-Southwest	Moderate-Light (5-10 mph)	81	31	23.1	Routine
	10/5/2021	7:00	Low Tide	Clear	North	Light (0-5 mph)	82	20	18.9	Routine
	10/12/2021	7:00	Low Tide Falling	Cloudy	South	Moderate (10-15 mph)	82	64	20.0	Routine
	10/19/2021	7:00	High Tide Falling	Partly Cloudy	East-Northeast	Moderate-Light (5-10 mph)	80	10	20.5	Routine
	10/26/2021	7:00	High Tide Falling	Partly Cloudy	East	Moderate (10-15 mph)	80	10	19.8	Routine

North Beach

LCNB1　　　　　　　　**Beach Name** *North Beach*

Beach

Station ID

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/5/2021	7:22	Low Tide Falling	Partly Cloudy	East-Northeast	Light (0-5 mph)	67	31	1.7	Routine
4/12/2021	7:18	Low Tide Falling	Clear	East-Northeast	Light (0-5 mph)	70	64	2.0	Routine
4/19/2021	7:20	Low Tide	Clear	North-Northwest	Light (0-5 mph)	63	207	0.4	Routine
4/26/2021	7:17	High Tide Rising	Clear	East	Light (0-5 mph)	72	20	0.9	Routine
5/3/2021	7:15	Normal	Cloudy	South	Moderate (10-15 mph)	74	99	0.1	Routine
5/10/2021	7:15	High Tide Rising	Cloudy	East-Northeast	Light (0-5 mph)	75	150	0.1	Routine
5/24/2021	7:15	High Tide	Partly Cloudy	East	Light (0-5 mph)	74	87	0.1	Routine
6/1/2021	7:15	Low Tide Falling	Partly Cloudy	East-Southeast	Light (0-5 mph)	78	53	0.2	Routine
6/8/2021	7:15	High Tide Rising	Partly Cloudy	South-Southeast	Moderate-Light (5-10 mph)	81	2005	0.1	Routine
6/15/2021	7:13	Low Tide Falling	Clear	North-Northwest	Light (0-5 mph)	84	31	0.1	Routine
6/22/2021	7:15	High Tide Rising	Rain	South-Southwest	Light (0-5 mph)	82	429	1.5	Routine
6/29/2021	7:15	Normal	Partly Cloudy	East-Northeast	Light (0-5 mph)	81	1091	1.0	Routine
7/6/2021	7:13	Normal	Clear	East	Light (0-5 mph)	84	20	0.3	Routine
7/13/2021	7:12	Low Tide	Clear	East-Northeast	Light (0-5 mph)	83	429	0.7	Routine
7/20/2021	7:20	Normal	Cloudy	South-Southwest	Light (0-5 mph)	82	560	0.1	Routine
7/27/2021	7:12	Low Tide	Partly Cloudy	South	Light (0-5 mph)	88	10	0.1	Routine
8/3/2021	7:10	High Tide	Cloudy	East-Southeast	Light (0-5 mph)	85	75	0.6	Field Duplicate
8/3/2021	7:10	High Tide	Cloudy	East-Southeast	Light (0-5 mph)	85	137	0.6	Routine
8/10/2021	7:13	Low Tide Falling	Clear	South-Southeast	Light (0-5 mph)	85	20	1.7	Routine
8/17/2021	7:10	Low Tide Falling	Partly Cloudy	Southeast	Light (0-5 mph)	84	2005	2.7	Routine
8/24/2021	7:15	Low Tide Falling	Clear	Northwest	Light (0-5 mph)	89	75	3.8	Routine
8/24/2021	7:15	Low Tide Falling	Clear	Northwest	Light (0-5 mph)	89	20	3.7	Field Duplicate
9/21/2021	7:10	Normal	Partly Cloudy	East-Southeast	Light (0-5 mph)	83	20	0.4	Routine
9/28/2021	7:08	High Tide Falling	Rain	Southwest	Moderate-Light (5-10 mph)	78	2005	0.8	Routine
10/5/2021	7:08	Normal	Clear	North	Light (0-5 mph)	74	42	0.3	Routine
10/12/2021	7:15	High Tide	Cloudy	South-Southeast	Light (0-5 mph)	80	478	1.0	Routine
10/19/2021	7:10	High Tide Rising	Clear	East-Northeast	Light (0-5 mph)	71	31	2.0	Routine
10/19/2021	7:10	High Tide Rising	Clear	East-Northeast	Light (0-5 mph)	71	164	2.0	Field Split
10/26/2021	7:10	Normal	Partly Cloudy	East-Northeast	Light (0-5 mph)	76	254	4.7	Routine

Rutherford Beach

RUTH1　　　　　　　　　　　　　**Beach Name** *Rutherford Beach*

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/5/2021	7:07	Low Tide	Clear	East	Light (0-5 mph)	69	10	14.4	Routine
4/12/2021	7:14	High Tide Falling	Clear	Southeast	Light (0-5 mph)	70	20	11.5	Field Split

Beach

Station ID

Date	Time	Tide	Weather	Wind Direction	Wind Speed	Water Temp	Entero-cocci	Salinity	Sample Type
4/12/2021	7:14	High Tide Falling	Clear	Southeast	Light (0-5 mph)	70	20	11.5	Routine
4/19/2021	7:07	Low Tide Falling	Clear	Northeast	Light (0-5 mph)	67	20	25.6	Routine
4/26/2021	7:00	High Tide Falling	Partly Cloudy	South	Moderate-Light (5-10 mph)	72	10	19.0	Routine
5/3/2021	7:03	High Tide	Cloudy	South	Moderate-Strong (15-20 mph)	80	31	8.5	Routine
5/10/2021	7:05	Low Tide Falling	Partly Cloudy	South	Moderate-Light (5-10 mph)	80	64	12.5	Routine
5/24/2021	7:15	Low Tide	Fog	East-Northeast	Moderate-Strong (15-20 mph)	80	53	7.4	Routine
6/1/2021	7:05	Low Tide	Partly Cloudy	South	Moderate (10-15 mph)	81	111	11.7	Routine
6/8/2021	7:09	Low Tide Falling	Scattered Clouds	South-Southeast	Moderate-Strong (15-20 mph)	82	271	7.3	Routine
6/15/2021	7:03	Low Tide	Clear	Calm	Calm (0 mph)	86	10	22.3	Routine
6/22/2021	7:03	Low Tide Falling	Cloudy	South	Moderate-Light (5-10 mph)	85	124	19.4	Routine
6/29/2021	7:07	Low Tide Falling	Scattered Clouds	East-Southeast	Light (0-5 mph)	84	124	10.7	Routine
7/6/2021	7:05	Low Tide	Scattered Clouds	South	Light (0-5 mph)	85	99	19.7	Routine
7/13/2021	7:06	Normal	Clear	South-Southeast	Moderate-Light (5-10 mph)	82	31	18.8	Routine
7/20/2021	7:02	Low Tide	Rain	South	Moderate-Light (5-10 mph)	80	344	12.6	Routine
7/27/2021	7:01	Low Tide	Cloudy	South	Light (0-5 mph)	71	2005	28.8	Routine
8/3/2021	7:05	Low Tide	Rain	South	Light (0-5 mph)		384	26.6	Routine
8/10/2021	7:05	Normal	Scattered Clouds	South	Moderate-Light (5-10 mph)	89	99	21.1	Routine
8/17/2021	7:05	Low Tide Falling	Scattered Clouds	East-Northeast	Light (0-5 mph)	86	531	17.1	Routine
8/24/2021	7:01	Low Tide	Clear	Northwest	Light (0-5 mph)	80	42	19.2	Routine
9/21/2021	7:01	Low Tide	Scattered Clouds	South-Southwest	Moderate-Light (5-10 mph)	83	20	18.5	Routine
9/28/2021	7:09	High Tide Rising	Cloudy	South	Moderate-Light (5-10 mph)	79	659	18.5	Routine
10/5/2021	7:03	Low Tide	Clear	North	Light (0-5 mph)	77	31	17.2	Routine
10/12/2021	7:20	Low Tide Falling	Cloudy	South	Moderate (10-15 mph)	82	53	18.7	Routine
10/19/2021	7:03	Low Tide	Partly Cloudy	Northeast	Light (0-5 mph)	72	192	22.1	Routine
10/26/2021	7:05	Low Tide	Fog	West	Light (0-5 mph)	80	42	17.8	Routine

APPENDIX D

Summary of Louisiana BEACH Program's
Fulfillment of U.S. EPA's BEACH Grant Requirements

Summary of Louisiana BEACH Program's
Fulfillment of USEPA's BEACH Grant Requirements

USEPA established nine performance criteria that eligible coastal or Great Lakes state, tribal, or local governments must meet to receive grants to implement coastal recreation water monitoring and public notification programs under the BEACH Act. Those criteria, together with a summary of how Louisiana has fulfilled each, are provided below.

Category	Performance Criterion	Louisiana's Fulfillment of Criterion
Evaluation and Classification	1. Develop risk-based beach evaluation and classification plan	Identification of factors used to evaluate and rank beaches are provided in Chapter 2 of the *Louisiana's BEACH Grant Final Report, Grant Year 2001* (the "Initial BEACH Report"; LDHH, 2003). More specifically: • Coastal recreation waters are identified in Section 2.1. • Beaches used by the public for water contact activities within coastal recreation waters are identified in Section 2.2. • The original information describing (1) the potential risk to human health presented by pathogens and (2) the use of the beaches is provided in Sections 2.3-2.4 of the Initial Report. Information on the prior year's water quality and projected level of use for each beach monitored under the Program are provided in Chapter 2 of the Program's annual report. • EPA is notified annually of any change in beach rankings and other program changes in Chapter 2 of the Program's annual report.
Monitoring	2. Develop tiered monitoring plan	• Chapter 3 of the Initial BEACH Report describes the Program's monitoring plan, addressing the frequency and location of beach monitoring, and assessment criteria. • Chapter 2 of the Initial BEACH Report describes periods of recreational use of the waters, and nature and extent of use during certain periods. • Sample stations were established based on spatial use patterns as described in Chapter 2 of the Initial BEACH Report, adjusted for the proximity to known point and nonpoint sources of pollution. • Section 3.1 of the Initial BEACH Report outlines the Program's quality control plan, which is described more completely in the Program's current Quality Assurance Project Plan (QAPP).
	3. Monitoring report submission and delegation	The Program reports monitoring data to the public, EPA, and other agencies through timely annual submission of those data to EPA's STORET database. Additionally, the full dataset and summaries are provided in the Program's Annual Report.

	4. Methods and assessment procedures	Methods for detecting levels of pathogen indicators in coastal recreation areas are described in Section 3.3 of the Initial BEACH Report and the QAPP.
Public Notification and Prompt Risk Communication	5. Public notification and risk communication plan	Measures to notify the public, EPA, and local governments when indicator bacteria levels exceed a water quality standard are provided in Chapter 4 of the Initial BEACH Report.
	6. Measures to notify EPA and local governments	Measures to notify local governments and EPA when water quality standards are exceeded are provided in Chapter 4 of the Initial BEACH Report. The Program submits notification data and actions taken to notify the public to EPA's PRAWN database annually.
	7. Measures to notify the public	Measures to notify the public when water quality standards are exceeded are provided in Chapter 4 of the Initial BEACH Report. Upon observing an exceedance of beach advisory criteria, the Program immediately issues a public notification or resamples for bacterial exceedance of a water quality standard in accordance with the QAPP. The notification is placed on the Program's website, disseminated to the media, and signs posted at each station are changed to indicate that an advisory is in effect.
	8. Notification report submission and delegation	• EPA and local governments are notified annually of any notification plan changes and any delegation of responsibilities in the Program's annual work plan. • The Program reports actions taken to notify the public when water quality standards are exceeded in its annual PRAWN submission and in the Program's annual report.
Public Evaluation	9. Public evaluation of program	The Initial BEACH Report and all subsequent annual reports have been made available to the public for review and comment. The Program publishes a public notice informing the public of the availability of the annual report and the duration of the comment period, and the report is made available on the Program's website.